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PREFACE.

THE singular anomaly of a medical amateur writing on this subject, it may be said, requires explanation, if not apology: the latter, perhaps, would require the twofold condition that the subject should be one not previously understood, and that the conclusions arrived at should bear evidence of considerable practical utility. The scientific surgeon needs not be told that a practical knowledge of comparative should accompany, if not precede, his knowledge of human anatomy; that the laws which apparently regulate the phenomena of life and action in man and the brute creation are almost identified; that the lungs of quadrupeds agree on the whole, in structure, form, and connection, with those of the human subject; that in treating the diseases of either, similar ends are rarely obtained by different means, or at least by application of different principles: he needs not be told that the cultivation of comparative anatomy has enabled the genius of Hunter to leave to his country one of the most splendid monuments of human industry; that through it he explained, systematized, and simplified his art; by it he connected

the study of pathology with physiology, and their union may bid defiance to time.

To the cultivation of this parent branch of medical science I am chiefly indebted for any capability I may possess to examine and discuss this most difficult subject. I prosecuted the study of comparative anatomy rather practically than otherwise; as extensively as opportunity allowed, I read the observations of other men, but trusted only to my own: wherever I met a mere opinion, I invariably sought and preferred a reason, resolving that if I could know but little, at least I should know that little well: those opinions I could not prove, I rather tolerated than adopted, and left to time and further experience their rejection or admission. However practically useful such a method may be in the general study of physiology, I found it perfectly indispensable in acquiring any satisfactory knowledge of diseases of the lungs. I could discover no standard authority upon their anatomy or physiology*, and the total failure of their therapeutics† is a matter of notoriety to all.

Under these circumstances, although gifted myself with nothing of wit or imagination beyond mediocrity, but possessed of a taste for inquiry and some judgment, I endeavoured to make the labour of inquiry and drudgery of investigation supply me with

* The doctrine of the natural action of the living principle.

† The doctrine of the treatment and cure of diseases.

that information which I could not acquire from books. To that end I attended for a considerable time an infirmary for the exclusive treatment of diseases of the lungs, where I had considerable opportunity of observing their disease in all its variety; their treatment, and post-mortem examination. How far, and with what justice, I have differed from the general opinions upon phthisis, as to its cause and treatment, the present essay serves to shew. My conclusions, if admitted generally true, their exceptions will not materially diminish their utility and importance. Their correction I shall leave to abler hands, and at least content myself with the satisfaction of directing the researches of others, whose talents will accomplish and complete the explication of a subject of far too great importance to remain for ever in abeyance. Numbers have brought to the inquiry all the advantages of refined education and great experience, yet their efforts have hitherto stopped short at the comparative degree.

"I have often regretted," says the celebrated Cullen, "the impotency of physic in consumption, "and have often wished to improve this part of our "art. I do not despair of a remedy being found "hereafter: there is nothing satisfactory to be got "from books."

Another high authority, on the same subject, says, "the pathology * and practice are in a most unsatis-

* The doctrine of morbid action of the living principle.

" factory state ; nor can any thing be conceived more " contradictory than the writings on both these " subjects."

Unfortunately for humanity time has not yet altered the justice of the observation. However anxious I am to arrive at truth, I may fairly say I have no personal object to serve in this inquiry.

Having no friends to seek amongst professors, or rivals to conciliate in the profession,—a stranger alike to the jealousies or prejudices of either,—I have no motives to conceal, palliate, or exaggerate any circumstance ; but merely as an individual assert my right of private judgment on a subject which has occupied me much,—a subject which history cannot prove the medical profession, at any period of the world, succeeded in making exclusively their own, and which, as long as it remains in its present undecided state, is fairly open to the consideration of all mankind.

In a manner as concise as I am capable of, I have endeavoured to methodize and condense all the useful *materiel* furnished me by experience and observation, that bears directly on the subject. In order to make out a clear case for inquiry, I have briefly quoted some of the most remarkable authorities on the subject, from the time of Hippocrates to the present day. No matter by whom written, it must be admitted as a general rule, that what are called popular medical works have, to the public, a mischievous tendency. People are too apt to fancy they discover

their own real or imaginary case, if it is faithfully described; and thus the merit which is given to the picture of the disease is, without judgment or consideration, at once transferred to the remedy. But the present perhaps forms a fair exception; it treats of a disease to which all are liable, and on which the medical world agree but in one point, namely, its incurability.

I cannot let the present opportunity pass without acknowledging the great, and to me indispensable, assistance I derived from the works of Laennec, Majendie, Lawrence, from the experiments of the great Dr. Crawford, Mr. Kite, Dr. Fothergill, and most particularly from Mr. Coleman's celebrated Dissertation upon Natural and Suspended Respiration,—a work which, original and valuable as it is, perhaps from its great scarcity is but little known to the junior members of the profession.

ESSAY,

&c. &c.

INTRODUCTION.

THE fame which rewards excellence in mathematics, mechanics, and all the speculative branches of science, permanent and exciting as it may be, is yet far inferior to the luxury of advancing and improving the art by which we may assuage pain and lessen the sufferings of humanity,—resuscitate the drooping energies of the sick,—and even when hope, the last friend of the afflicted, spreads her wings, we may yet stay her flight, and by an effort of our mind save many a painful reminiscence, and restore to the bosom of friendship the child, the parent, or the friend.

It has been my fate to collect and arrange those opinions under many disadvantages, unpatronised, unassisted—rather deterred by the dread of freezing criticism than encouraged by hope of fame, I still ventured in a field where success was hitherto so uncertain, and, even if attained, so likely to pass unrewarded. However, the result of considerable ex-

perience of the disease, of great and untiring inquiry as to its nature and cause, leaves me perfectly confident that I shall redeem the title of this essay, and prove that what has hitherto been called impossible, is only difficult, and that those difficulties exist not so much in the disease itself as in our erroneous method of considering it.

Those members of the profession, whom great experience and a long career of successful practice have justly styled "eminent," although many of them possessed of abilities and industry sufficient to command success in any of the walks of life, have thrown no light upon this fatal disease. Having much to risk, they preferred to sit down content with the laurels which they had achieved in other inquiries, and to a man avoided a theme which led their predecessors to nothing but to barren regions.

Whatever chance of celebrity a medical author may have individually, he is sure to diminish it on placing himself in collision or comparison with acknowledged merit, and the risk is still further increased, if that merit is sanctified by time. He may be outlawed—banished a profession—by which he fancies himself to be too enlightened to be directed, and which he may be considered too presumptuous to teach. The frown of power and hiss of bigotry may crush an unprotected man, whose only boast might be that he had industry enough to inquire, courage enough to decide, and ability enough to confute.

Time was when the medical, of all other professions, was considered the most illiberal,—when the discoveries of a Harvey or a Jenner had first to go through the ordeal of public opinion before they were received,—when medical authors looked upon each other with a jealous eye, each fancying all the rest to be embarked in a pursuit, which, if successful, must be to his own individual prejudice; but I trust that time is passed away, and as this disease, this *opprobrium medicorum*, is confessedly as little understood now as it was 2,300 years before the discovery of the circulation, it would be, I consider, rather *hardy* in a profession, positively useful, really scientific, and practically liberal, (even if in their power,) to stifle inquiry; for, as they cannot lose information which they neither do nor ever imagined they possessed, it will not be believed that, for any reason scientific or humane, they would discourage another in making a step to supply it. The power of man is finite: the difficulty would seem to be, to ascertain where shall inquiry stop, where draw the line betwixt what is discoverable and what must ever remain occult. For my own part, with a zeal which perhaps outstripped my abilities, I have, after the most laborious and patient inquiry, here rejected the mention of any effect which I could not trace to an adequate cause, guided always by those principles which are universally admitted to be true; and I have yet a sanguine hope that the conclusions I have arrived at, which, by any knowledge, logic, or

sophistry I am possessed of, at least I cannot refute, will be received in the spirit with which they are written. It should be recollected that every thing important—every thing great was at first but little, and rose to importance and maturity by constant, although imperceptible accessions. Neither should it be forgotten (and I mention it with sincerity and respect) that the merits or miseries of medical men have been related by themselves. On these subjects they have been occasionally the approvers, often the accusers, and always the judge; that too often, in professional pride, they have forgotten that their stock of knowledge is not of their *own individual creation*, but the collected efforts of ten thousand intellects, generally begun in speculation, and condemned or adopted on experiment. The medical critic, whilst he holds the balance of judgment, and with anxious care preserves his "order" from spurious innovation, on the other hand, should foster and encourage inquiry proportioned to its merit, and not attempt to run down by ill-placed ridicule, or censure opinions, the publication of which can be found to possess at least the moral defence of honest conviction and purity of motive. To imagine expression of opinion should be confined exclusively to those whose celebrity and experience alone would be capable of raising expectation, is a supposition too intolerant to be entertained. Many of the discoveries in medicine and surgery were the result of simple accident; and some of the most important improvements in che-

mistry were effected by the vain researches after the philosopher's stone. Works of superlative utility are not of every-day growth, and even when time and experience have stamped their true value, none are found disingenuous enough to judge of them only by their defects, for even works of purest demonstration are not altogether free from some inconsistencies. To condemn every work not positively excellent, as necessarily useless, would be to establish a censorship which would speedily bring the never-ending subject of medical inquiry to a stand. The opinions of those whose high celebrity may defy, and those whose obscurity may dread scrutiny, should pass through a similar ordeal, and be judged with similar impartiality: to be condemned unheard will ever be a negative defence for a worthless production.

Most authors are important (at least) in their own eyes, but there is a class which can scarcely claim that solacing dignity; their is a sort of selfish consolation in not suffering alone, hence we shall find *some authors* on this subject, who, cautiously avoiding the most glaring errors of their predecessors, seem to console themselves with the fancy that they are not bad whilst others can be found worse; and although they candidly acknowledge the faults of their brethren (for they can bear the failures of others with the greatest fortitude), they generally do so with some trifling reservation in favour of themselves. But, alas, their efforts were vain: to promise

returning health when it could not be restored—to flatter misery with expectation of relief—to sow the seeds of hope when experience promised nothing but disappointment—to smooth the path which fate had inevitably marked out for its victim—was the discouraging task which hitherto was wont to change the corporeal to the spiritual minister; it was the point where mortality triumphed,—where nature ever derided the efforts of art.

It will be found that in this essay there is but little claim to genius: "in any inquiry into nature it must act a subordinate part; it may arrange, but must not fabricate;" here there shall be no tax laid upon credulity, and but little use of conjecture: in every elucidation (as far as the case admits of) evidence shall precede opinion. If in this attempt to decide for myself, I shall be found, even in a remote degree, to have violated any ancient immunity, or questioned any undefined prerogative, I still hold myself guiltless of any intended personal offence: my objections are not to men, but to system.

It will not be denied that, if a man is capable of speaking on a subject, the capacity establishes his right; if he has not a genius equal to his theme, and mayhap vegetates in a state of unenvied obscurity, his opinions, whatever they may be, will not harm; if he is not a light to guide, he never can be one to lead astray. But it may be otherwise if he should be a man of celebrity; for as a handsome face is a letter of recommendation, so we too often find an esta-

blished reputation sufficient to canonize error and protect absurdity. It can be readily shewn how far the professorial opinions have been followed,—how far medical men have (at least in this instance) imperceptibly acquired the habit of adopting instead of investigating; and such is the prejudice of the Lazzaroni of the profession, of those who prefer knowledge second-hand to the labour of inquiry, that the difficulty and sometimes danger of expression of individual opinion on medical subjects has carried many an ingenuous mind, *nolens volens*, along the current of what they call legitimate practice.

It has been truly said, "we think according to "nature, speak according to precept, and act ac- "cording to custom." Most of those authors who have written upon the peculiarities of the lungs, seem so closely to imitate each other in style and opinion, as to form a perfect family likeness. The thing most to be deprecated in them, is their vitiated taste for adding to the already too voluminous medical nomenclature. To the reader who may be disposed to trace for himself the progress of medical knowledge on this subject, a review of the various opinions of authors, for upwards of two thousand years successively, may prove both interesting and useful. *A priori*, it might be expected that of all the improved arts, the medical, from its antiquity and importance, would be "the first on the very first "line;" and that the finite power of man would long since have reached that goal at which investiga-

tion and inquiry might halt. History tells us, that medicine, like nations, has had its infancy and maturity; that the generality of mankind at all periods of the world have esteemed men's merit by their success; and that our simple forefathers were not at least behind us in venerating those things most which they least understood. Hence we find those who were reputed most skilled in the art some centuries antecedent to Christianity, were the most respected of mankind, were honoured and rewarded during their lives, and after death were numbered amongst their gods. Mankind has ever implied by the idea of genius that it was rare; but the moderns, by the aid of various discoveries and inventions, have brought all men nearly on a level,—by the establishing of sound principles of inquiry, have improved their standard of judgment. Hence, whatever medical knowledge we possess is possessed in common; at the present moment few can claim exclusive or superlative knowledge in the art,—whatever is known *may be* known to all.

OPINIONS OF VARIOUS AUTHORS.

HIPPOCRATES.

The origin of medicine is obscure, it is left to conjecture and cannot be supplied by history: in olden times diplomas were unheard of; in fact, the first man was the first physician; the sick were exposed on the road-side to learn of travellers some advice on the nature and treatment of their maladies; and Herodotus tells us, the Assyrians made a law to compel persons as they passed by the sick to examine, and, if they were capable, to prescribe for them,—some charitable persons even deposited their prescriptions in the public temples for the benefit of the community at large. Any thing in the practice of medicine at first must have been the result of simple observation; the fatal or fortunate effects of the various remedies and cases, with their simple or superstitious comments, were handed down from generation to generation, with all the accuracy *peculiar* to tradition; and amongst the distinguished individuals to whom such a legacy descended, none were so worthy or so justly celebrated as Hippocrates, commonly called the Father of Medicine. He is supposed to be descended from Esculapius, son of Apollo, and, according to Heathen Mythology, God

of Physic. He was born in the island of Cos, about 430 years before Christ. He was contemporary with Socrates, Democritus, and Herodotus. It suits not our present purpose to enter into the various conjectures about his early life and education; it is so uncertain as to form a subject less suited to the historian than the antiquary. It would appear, however, he brought to the inquiry a powerful mind, *unprejudiced by the erroneous opinions* of others, and although, like most framers of new systems, he is occasionally forced to make conjecture supply the place of fact, he must be still considered a prodigy. He made medicine and surgery the sole business of his life, and, as history informs us, practised with almost miraculous success to the age of 108 years, and at his death was paid all those honours peculiar to his time and country.

His knowledge of anatomy was necessarily very imperfect, as dissection was not then permitted. Notwithstanding his limited opportunities of observation, he has given anatomical names to various parts of the body, which are in use to the present day. The lungs (he says) are naturally cold, and respiration renders them colder; they attract a nourishment contrary to their substance,—all other parts attract those which are similar to themselves*. They are the seat of thirst. The lungs, with their heat, attract phlegm out of the whole body†, especially

* Lib. de Alimento. † De Morbo.

the head. Hippocrates goes on to say—"The heart is the hottest part of the body*. The soul resides in the left ventricle of the heart†; and is not nourished with meat from the stomach, but with a pure substance separated from the blood. The soul of man creeps into him with fire and water: it is increased until death‡. If a man draws in air through his mouth (his nose being closed), the breath then first comes to the brain§. Part of our drink goes to the lungs.

"Young people are subject to a spitting of blood‖, consumptions, acute fevers, but particularly to lung affections. Consumption occurs oftenest between the ages of eighteen and thirty-five¶. Those who cough up frothy blood bring it from the lungs**. If the matter is not evacuated upwards in fourteen days in pleurisy, it will terminate in abscess††. The abscess or imposthume by a pleurisy, if the matter, after bursting, be evacuated upwards within forty days, will be cured, if not, it will end in consumption‡‡.

"Nature is equal to all things in all animals; it knows whatever is necessary without being taught§§. In acute diseases exercise is pernicious‖‖. It is

* De Princip. † De Corde.
‡ De Diæta. § De Morbo Sacro.
‖ Coac. iii. 260. Aph. xxix. sect. 3.
¶ Aph. ix. sect. 5. ** Coac. iii. 216. Aph. xiii. sect. 5.
†† Loc. in Hom. xxv. 10. ‡‡ Morb. 10, Aph. xv. sect. 5.
§§ Lib. Epid. ‖‖ Lib. Epid. 6.

dangerous much, and suddenly either to empty, fill, heat, or cool, or by any other means to move or stir the body; for whatever is beyond measure is an enemy to nature; but that is safe which is done by little and little, especially when a change is to be made from one thing to another*.

"In hectic fever the breast is pained, cough is violent, a great discharge of thin mucus; the disease produces great emaciation; there is an unquenchable thirst throughout, and great debility; the patient generally dies in a year, even with every attention†."

He recommends asses' and cows' milk in *tabes ossis sacri*. Various aperients are recommended with milk: after these preparatory measures, he advises the application of cauteries in four different parts of the back‡.

In his book on Internal Affections, he mentions a consumption lasting nine years, attended by perspiration, chills, and great debility;—he recommends the warm bath. This species of consumption he considered depended upon some affection of the spine. The patient should take walking exercise, commencing with two miles, and go on increasing it to fifteen. He recommends attention to digestion, and the patient to take a decoction of herbs with kidney fat; afterwards his diet should be of bread

* Aph. vi. sect. 2. † De Inter. Affect. ‡ De Inter. Affect.

and wild-boar fat, and he will be likely to recover in about a year.

In Empyema, where he says the patient is troubled with a dry cough, and is obliged to sit upright, if the pus cannot be evacuated, it breaks through the lungs into the cavity of the chest, and for a time relieves the patient; but the symptoms re-appear in an aggravated degree. "He must now (he continues) rest fifteen days to allow the pus to become more putrid, and then operate with the knife or cautery; letting off the water gradually, for a sudden evacuation would kill the patient*."

Bodies attenuated and wasted with long sickness are, he says, to be restored and refreshed gradually; but those which are brought low quickly must be quickly restored†. Change of seasons are most effectual causes of diseases, and so are the alterations of cold and heat in those seasons‡. In his book (De Ration. in Vic. Acut.), he recommends bleeding from a large orifice in *all acute diseases*. After consumption comes a flux of the head, and from this flux comes a diarrhœa; from this a stoppage of what should be evacuated upwards, after which succeeds death§.

His medicines were extremely simple: honey, vinegar, garlic, and sulphur for cold, phlegm, and

* De Morb. lib. 2. † Aph. 7, sect. 2; Springel Ed. 1708.
‡ Aph. 1, sect. 3; Springel Ed. 1708.
§ Aph. 3, sect. 7; Aph. 78; Springel Ed. 1708.

inflammation of the lungs; myrrh for diseases of the stomach; alum for hæmorrhage; and asses' milk for consumption. "I praise that physician," he says, "who knows how to distinguish himself above "all others by his skill, in improving the ordinary "methods in curing those acute diseases which "make the greatest havoc amongst mankind*."

CELSUS.

Celsus was the most celebrated Roman physician of his day; born, it is supposed, at the close of the reign of Augustus, about 400 years after Hippocrates, whose opinions he principally adopted†. He says:—

"It is not to be imagined he should know the re-"medy of diseases who knows not their origin."

"Nothing is more foolish than to suppose a man "has been so in his life-time as he is found when "dying or already dead.

"An opinion of a thing without a certain know-"ledge of it can never find out an infallible remedy "for it.

"It is certain, that experience is the principal "thing to inform us in a right method.

"Physic is a conjectural art, but such as neither "experience nor conjecture can make always suc-"cessful."

* De Ration. Vic. in Acut. † Vide Springel's Aphorisms.

For a consumptive cough he advises the patient to run and read aloud, and not mind the interruption of the cough, which, he says, will gradually subside. "That air (he continues) is the worst to a person that was the cause of his sickness. There is one species of consumption in which the body is not nourished, and as something is always passing off, but nothing entering to supply the place, extreme emaciation arises, and unless it is removed, it carries a person off. The Greeks called it *Atrophy:* it generally happens from two causes; for either a person takes less food than he ought from excessive fear, or more than is proper from excessive voracity, so that what is deficient causes weakness, or that which is redundant is corrupted *. There is another kind, called by the Greeks *Cachexia,* produced by a bad habit of body, which corrupts all sorts of nourishment—the termination of a long illness, which does not admit of a return of strength. There is a third kind—the Greeks have called it *Phthisis:* it generally arises in the head, then falls down to the lungs; ulceration follows; from this slight fever takes place, which abates and returns; there is frequent cough; pus is expectorated, and sometimes something bloody."

For phthisis he advises change of air. The disease, he says, generally occurs between the age of eighteen and thirty-five. He recommends milk. If

* Celsi, De Re Medic. lib. xxii. prim.

a fever has not already come on, or has remitted, recourse must be had to exercise, walking, and gentle friction. The bath is injurious. "The food," he says, "should be at first pungent, then light, as gruel, from phtisan or starch, with addition of milk; also flour with mutton or goat's suet afterwards, boiled as a medicine, and light wine. If this does not suffice, an ulcer is to be made with a hot iron under the chin, another under the throat, in two places on each breast; likewise at the extremities of the blade-bones,—which wounds are to be kept open till the termination of the cough. Three or four times a day the extremities are to be actively rubbed; the thorax is to be rubbed gently by the hand in an hour after food; the legs and arms are to be rubbed: ten days having elapsed, the patient is to be put into a bath in which there is warm water and oil; on the other days water is to be drank; then wine, if there is no cough, is to be given cold; if there is, with the chill taken off. The principal things are diet, gestation, sailing, and gruel. He who begins to be a little better should increase his exercise, friction, and food; then rub himself, holding his breath *."

* Lib. xxxii. ter.

GALEN.

We next come to Galen, a man who possessed all the advantages of wealth, education, travel, industry, and experience, born about 200 years later than Celsus. He is said to have written upwards of 200 volumes, which were supposed to have been burned in the Temple of Peace. He was a follower of the Hippocratic school: he was educated at Alexandria, but practised at Rome *. He mentions marasmus or atrophy as incurable; and calls old age a specimen of it, when the expenditure of blood is greater than its production, not unlike the death of a starved animal; but, in old age, it may be retarded by bathing, nutritious food, and sleeping on soft beds, to preserve the moisture of the heart; for in marasmus, he says, the heart is dried up.

"Hectic fever," he says, "generally arises from an affection of the heart, not from the lungs: if the lungs are first affected, they should get cold air; bathing is strongly recommended, commencing the process with warm and ending with cold water: but if marasmus is once established, the case is bad. Asses' milk and gruel is the proper diet for the hectic patient."

He considered consumption infectious. In pulmonary consumption, if a vessel bursts, unless it unites without inflammation, the disease is incurable, and the operation for cleansing the lungs is injurious.

* Basil. 1562.

He mentions a species of remedy called bechics, which were used to excite cough in order to cleanse the lungs. He relates a case of a lady who sent for him on the first appearance of blood in expectoration; he had her legs and arms rubbed and bandaged, and her head shaved, and then covered with pigeons' dung; then ordered her a bath, and had her kept warm afterwards, and allowed her some wine and fruit; and the cure was completed by frictions and opiates without the use of milk.

The cases radically incurable are those that depend upon a fault of the humours; but, before the appearance of spitting of blood, he says, his remedies *sometimes* effect a cure: they were chiefly baths, exercise, and country air: his medicines—colocynth, aloes, scammony, hyoscyamus (nearly the same as used to the present day). Those that are curable, he says, are cured by remedies that tend to strengthen the head.

The opinions of this triumvirate principally governed the medical world down to the seventeenth century. They were not held in much esteem by the celebrated Lord Bacon. "Galen," he said, "was a man of very narrow mind, a deserter of experience, an idle caviller. This is the man that would screen the ignorance and sloth of physicians from their deserved reproach, and preserve them unattacked, whilst himself most feebly and unequally

pretends to perfect their art, and fill up their office ;—this is the man that pronounced certain diseases incurable, taking away all glimmering of hope, and leaving no room for future industry ;—this is the man who, upon every occasion, maliciously curbed the human power, and endeavoured to surround and protect ignorance with eternal despair.

" Let Hippocrates be next called to the bar, whom we arraign as a creature patched up of antiquity, and a retailer of other men's knowledge; under whose authority both Galen and Paracelsus ridiculously endeavour to shelter themselves, like asses under a tree. To do him justice, he seems to have his eyes at first fixed upon experience; but then they are fixed indeed—stupid and immovable, without ranging and searching for noble, manly, and full views.

" Celsus comes nearly up to the views of Hippocrates, which are not so faulty as they are useless; but he shews himself a mere practised sophister, and a better modeller of history than his master. He is, however, for checking science, from moral and civil considerations."

The medical world followed the practice of these authorities, with the occasional differences which time and accident ever produce: hence the generality of authors of these times give us little but the opinions, or their constructions, of the Galenic or Hippocratic dogmas.

The elder Pliny, the celebrated naturalist, mentions cases of consumption, in the last stage, being cured by using the dried lungs of a stag with *straight horns*, mixed with wine, and smoke-dried. He attributes great virtues to the effluvia of resinous woods, in preference to a voyage to Egypt, or a course of milk diet. He says, that "in Achaia a wolf's liver, asses' flesh and broth, with the fat of a lean sow, the smoke of dry cow-dung, *drawn through a pipe*, and powdered bullock's horns and honey, fat of a goat, and milk, are used for consumption*."

Abukeker Rhazes, born at Rhei, in the province of Khorassan. He was considered the Galen of the Arabians, and from his great success was styled "the experienced." He was the first author on diseases of children; and also the first authority for the use of fumigations, composed of myrrh, birthwort, arsenic, and butter. He was a great advocate for milk†.

The eccentric Paracelsus considered consumption to originate with want of moisture. Cough, he considered, might be produced by an affection of the kidney or liver, as well as the lungs. He recommended an ointment for universal friction, morning and evening. He also recommended a dose to affect the kidneys, principally formed of the fat of field-mice. He gained great notoriety by the novelty and success of his remedies. He is said to have boasted

* Lib. xxiv. 26, 28. † P. i. 959.

of being able to prolong life to the extent of several ages; but died young himself. He was, however, of great importance to medicine, being the *first* to point out the *peculiar* superiority of mercury to the vegetable medicines for some diseases. He was, however, generally opposed by his medical brethren*.

Forestus, an author of very high repute, holds the same opinion of hectic with Galen. He recommends milk from the breast, and the bath†.

Tulpius mentions a case of a piece of the lungs being brought up by the action of an emetic. He relates the case of a nutshell remaining seven years in the trachea; and another, of a cure being performed by indulging a patient in a longing for oysters‡.

Riverius, in his Opera Medica, mentions a practitioner that cured the last stage of consumption by the use of bread and oil; and another, by barley-sugar and craw-fish broth. He supposed the disease to be contagious, particularly to members of the same family.

Bonetus§ deals rather extensively in the marvellous. Amongst his medical anecdotes he quotes

* A. Ph. Paracelsi Bombast. ab Hohenheim opera omnia, 3 vols., Geneva.

† Foresti Observationum et Curationum opera omnia, 4 vols., Rouen.

‡ Tulpii Observationes Medicæ, Amst.

§ Boneti Sepulchretum.

the following :—A surgeon in Brussels recommends (by chance) water-cresses, raw and dressed; the patient, obedient to his advice, returns in about a year, quite recovered. The surgeon, in order to satisfy his curiosity, stabs him, and finds his lungs to have been completely corroded, and renewed again. The man's wife, who had been waiting for her husband, suspecting foul play, gets assistance from a magistrate. The surgeon, however, on account of the importance of the discovery, is pardoned.

The same author mentions the circumstance of a bony concretion being discharged, which was afterwards formed into a spoon, and was immediately reduced to a fluid state by its accidental contact with some water-cresses.

Gideon Harvey, one of the state physicians of his day, says, in his Anatomy of Consumption, "that "the disease begins between the ages of eighteen "and thirty-five." For its cure he recommends a variety of herbs; and remarks, "he once cured a "patient by the use of small draughts of water, "mixed with soot of burnt wood." In his Art of curing Diseases by Expectation, he says, "the "curing of a chronic cough is dangerous—palliative "remedies only should be used; for an old cough is "like a pump or issue, with which the superfluities "of the lungs throws out the crudities of the whole "mass. The cure of consumption by milk diet is

" as impossible as by it to reinstate a disjointed " limb, or to cement broken bones. An ulcer in the " lungs, with a contemporary hectic fever and con- " sumption, can no more be cured by asses' milk, " than a capon be roasted in the bottom of the " Thames. He that cannot cure an ulcer in the " lungs without asses' milk, in less than two months, " doth not deserve the name of physician. From " the tonsure remedy, by cutting off the hair of the " head, or from issues in the arm, no more help can " be expected, than from paring the nails in an " ulcerous consumption; although, in some few " cases, three or four caustics, applied to suitable " parts of the breast, may be useful."

Morton says an incipient consumption is distinguished from a catarrh by the dry cough; that a consumptive cough is mild in the beginning, and commonly accompanied with a disposition to vomit; that the disease may last twenty or thirty years; that its progress is more rapid in young than old persons; that the most frequent cause of consumption is catarrh; that it is highly contagious; that it is generally as curable as any other disease in the first or second stage; that in the beginning attention to digestion and *venesection* is indispensable, but in the latter stages it accelerates the disease. He advises the patient to be awakened at night to prevent sweating. For the prevention of phthisis, after hæmoptysis, he

advises the use of bark every four hours after venesection*.

Dover's Ancient Physician's Legacy to his Country recommends frequent venesections in small quantities, and he records a case of recovery thus treated after being bled fifty times.

Juncker† considered it injurious to stop the sweats by astringents—such practice hastens a fatal termination; he strongly recommends riding on horseback. Atrophy, he says, arises from obstructions in the mesenteric glands: it is usually accompanied by hectic fever, restlessness at night, oppression after food, and emaciation: it may be cured by Epsom salts, calomel, rhubarb, and antimonials; nitre is good if fever is present; the touch of the hand of a person who died of the disease has been found a very useful remedy, and also the use of anti-magical baths.

Russell, in his Dissertation concerning the use of Sea-water, asks, What can the physician do in consumption, when the vessels of the lungs are broken, when, besides, the fluids are poisoned by matter being absorbed and carried on to the general circulation with the blood? He recommends sea-water as the best remedy for subduing mesenteric obstructions.

* Morton's Phthisisologia.

† Junckeri Conspectus.

Cullen * says, "Sea-water has generally proved hurtful in cases of tubercles of the lungs." The causes of phthisis he places under five heads—"pneumonia, hæmoptysis, catarrh, asthma, and tubercle; and even when phthisis arises from hæmoptysis, asthma, or catarrh, it is still tuberculous. Tubercles, far more than any other, are the cause of the disease; but what are the circumstances more certainly determining to a happy or fatal event I have not yet been able to determine. Mania sometimes suspends the symptoms altogether. Pregnancy has often retarded it, but only for a time; all the symptoms speedily return and hurry on to a fatal termination after childbirth.

"In a phthisical person, when the slightest symptoms of the disease appears, we may presume that tubercles either have been, or are forming; we should immediately employ every means we can devise for preventing their formation, or procuring their resolution; but how, I cannot readily say. I do not know that physicians have proposed any remedy capable of preventing their formation, or of resolving them when formed; however, all that at present seems to be within the reach of our art is to take measures proper for avoiding the inflammation of tubercles. It is probable they may subsist long without producing any disorder; and I am disposed to

* Cullen's Practice of Medicine.

think Nature sometimes resolves and discusses tubercles which have been formed; but she only does so when they remain in an uninflamed state; and that the measures necessary to be taken are chiefly similar to those used for avoiding inflammation, namely, by blood-letting, and the antiphlogistic regimen, a total abstinence from animal food, milk, avoiding cold—for cold must be shunned to the degree of occasioning a catarrh, which consists in an inflammatory determination to the lungs, and may, therefore, most certainly produce an inflammation of the tubercles there."

Mudge * recommends, for the cure of a recent catarrhous cough, the inhalation of steam from a mixture of hot milk and water: its application for twenty minutes, he says, will effect a cure, combined with the use of opium. In consumption, before the lungs are much injured by the number of tubercles, or those not having yet suppurated with a dry husky cough, next to occasional bleedings, cooling and refrigerating medicines, and great temperance, are useful. Perhaps the greatest benefit will be found to be derived from the use of scapulary issues, assisted by vegetable diet and asses' milk: the discharge from the issues should be considerable. He has known several delicate persons catch severe cold by incautiously reading a damp newspaper.

* Cure for a Catarrhous Cough.

Dr. Beddoes, in his Observations on Consumption, recommends a temperature of 60° to 65° to be kept up in the apartments of the consumptive, and seemed to think not only the patient, but also the attendants, were less liable to cold from being constantly in them. He recommended the use of digitalis (foxglove), with full diet of meat twice a day, and wine occasionally.

A Mr. Read, in his essay, recommends patients in atrophy to live in a cow-house, where there would be from two to six animals, and the temperature to be kept up from 63 to 68 degrees: this, he says, is preferable to any fumigations for ulcers and tubercles. The animals should be fed upon aromatic plants, and the patient upon mild animal and vegetable diet *.

Bayle's Observations on Phthisis, we are told by his translator Barrow, were made after the inspection of 900 persons who died of the disease. He divides consumption into six classes; but says they cannot be easily distinguished during life. He adds, " it is almost always incurable; some die in a few weeks, some live more than forty years under the disease. Out of 200 cases at the Charité, 104 died within nine months. Chronic inflammation may contribute to the development of schirri or tubercles in subjects who are already predisposed to them. In occult phthisis,

* Essai sur les effets salutaires du séjour des étables, pa M. Read.

or germ of the disease, the lungs include tubercles ; sometimes they are not bigger than millet seeds, at others as large as nuts : the centre of these tubercular bodies, in this stage, are not as yet softened, nor are the symptoms sufficiently strong to excite fear of phthisis.

" In the second period, called incipient, the change in the lungs is a little more advanced ; a certain number of these tubercles are grown soft in the centre, or even already suppurate ; the symptoms in this stage are cough, general uneasiness, febrile movements, proving the existence of the disease. In the next stage most of the tubercles are in a softened state, and many of them have evacuated their pus ; some are already transformed into a small ulcer : the signs are now manifest—oppression of the chest, cough, and hectic fever, preclude all hope. From riding, walking, taking a voyage, declaiming, generous wine taken moderately, great benefit has been derived ; and all these remedies are useful to prevent tubercular phthisis, particularly when they are assisted by a good regimen and strengthening food, principally chosen from animal substances ; but when the symptoms of this disease shew themselves, we can sometimes mitigate them, or even stop them for a long time, by continuing the exercise, by use of tonics, bitters, antispasmodics, at the same time that we prescribe the repeated use of vomits. We can prevent or at least moderate the dangerous conse-

quences from tubercles, on their first appearance, by bleeding, leeches, evacuants, and by diluents, such as broth made of chicken, calves' lights, turtle, snails; also by the use of asses', cows', or goats' milk, and veal tea: riding on horseback and change of air may materially protract the disease."

Dr. Young, in his Practical and Historical Treatise on Consumptive Disease, says, "Of the immediate cause of consumption it is impossible to speak with any certainty, except to say what it is not. A great many depend upon a peculiarity of constitution, of which the first effect is the deposition of a morbid and apparently inorganic substance (tubercle) in the lungs." He considers it difficult to say whether the tubercle is the effect or cause of the disease. The chief remote cause, he says, is the removal from a warm to a cold climate: he advises exercise in the open air, especially riding, sailing, and change of scene: he prefers asses' milk and eggs to animal food.

The work which of all others has been called the standard authority on this subject, in the British school of medicine, is Laennec's. "Too light clothing," he says, "or the impression of cold, when the body is heated, seems, in our cities, to be the occasional cause of phthisis in many young persons, whose disease begins with a pulmonary catarrh or pleurisy (tubercles having *previously existed*). The depressing passions produce phthisis, if strong and of long

continuance." He considers " great austerity of life produces it; and instances a religious community of women who dropped off one after another in phthisis. No age nor figure is exempt from phthisis; the unborn fœtus has been found affected with it. Women are found more subject to it than men."

It is much to be regretted that so high and talented an authority as Laennec, whilst he so elaborately and systematically states his opinions about the *effects* of tubercles, so slightly passes over their true nature and origin. Throughout his work he speaks of them in the past tense: thus we frequently find the words, " tubercles having previously existed;" " tubercles in a state of softening;" and even when he casually pronounces them " inorganic," he furnishes us with no other data to support the opinion than his own assertion. It is not a little singular that perhaps we can refer to no book authority so well calculated to prove the exact reverse; and it is the general opinion of those, he continues, who are acquainted with the actual state of our knowledge that the tubercular affection is like cancer, absolutely incurable, inasmuch as Nature's efforts towards effecting a cure are injurious, and those of art are useless. Change of air is the chief remedy he recommends. The air of mountains is far from agreeing with all consumptive patients, and with those it does they seem to have only a small number of tubercles. When phthisis occurs in

mountain air its course is very rapid. Air of the country is better than town air; of warm climate better than cold: sea-side air is best. For quieting the cough, emollient drinks and alimentary matter, as milks, are best, also Iceland moss and arrow-root; for dry cough, opium in small doses; the hydrocyanic acid relieves the cough and dyspnœa. The cure of phthisis, he says, although possible for Nature, is not for medicine.

CONCLUSIONS.

If curiosity, or a better motive, should induce the reader to wade through these numerous authorities, he needs not be told that opinions so various, so contradictory, cannot *all* be right. When he learns that consumption causes one-fourth of the mortality of Great Britain—that every being he meets has lost a friend or relative by this frightful disease—I would fain enlist all his forbearance, judgment, and humanity, in forwarding this inquiry.

I appeal to those in whom a reverence for authority has not obscured the love of truth: Is not the test of twenty-three centuries of barren investigation of mere medical romance, with scarcely a ray of light to guide our steps, sufficient grounds for further inquiry? or is the practice of medicine in this instance, like law, to be founded on precedents? Is the medical pupil to be taught to believe? A Physician

has a right to respect authority, but in so doing he is also bound, in duty to himself and society, to ascertain upon what grounds: and no man or community, however distinguished, can question that right, or "justify his neglecting to exercise it." Both justice and the spirit of our laws hold that no man should be believed in his own cause, and I am not weak enough to suppose that my opinions will be taken *unsupported* for other and older opinions written with the aid of the experienced, and supported by the patronage of the great. No! but having a strong conviction that my observations may aid suffering humanity I wholly and unreservedly submit them, knowing that truth can bear to be related, and that my opinions, being rational, will bear to be explained.

The ancients appear to have known the use of principles; but they had a tact of laying them aside when they did not suit their purpose. It was this short cut to fact which gave rise to many of their unsupported conclusions; this, too, aided by the character of their time, that tempted Aristotle and Hippocrates to fix the seat of the soul: the latter was obliged to examine and *judge for himself;* he had no preceding opinions sufficiently arbitrary to lead him astray. The modern authorities on this subject appear to have known and followed principles: they evidently wished to draw no conclusions without assigning a relative cause. But before they

took up the use of deduction, in too many instances they formed false premises, or, more properly speaking, adopted those of others. Hence their conclusions were necessarily false. If we examine the chain of authorities, link by link, we shall find that for centuries many of them have followed the opinions of one another in the origin of the disease, the age at which it originates, its nature, cause, and mode of treatment.

I can see no possibility of coming to any thing like a sound conclusion upon the subject, until we put all those authorities, with few exceptions, aside, and commence *ab initio* to examine for ourselves. The difficulties that surround the inquiry depend not so much upon the want of evidence as its monstrous variety and accumulation; for, in truth, too many of those candidates for celebrity, instead of assisting, obstruct others, although they stand little chance to succeed themselves.

ON THE CIRCULATION OF THE BLOOD.

As this Essay is addressed to non-medical readers, I find it necessary here to allude to the powers which circulate the blood. I premise it is generally known that the heart and lungs occupy the chest. The heart itself has two distinct sides, right and left; from the latter the pure arterial blood is propelled with considerable force to all parts of the body, and after supplying the various secretions, as saliva, muscle, hair, nails, &c.—after thus, through the system, expending its strength and changing colour from vermilion to dark red—it is brought back again through numerous vessels called veins, by which it is poured into the *other, the right* side of the heart, which, by an effort of contraction, similar to the left side (already described), propels the blood as fast as it is supplied through a large artery (pulmonary) into the lungs, where the air we breathe immediately changes the blood in quality—from venous to arterial—from weak to strong—from dark red to vermilion. From the lungs, in this improved state, it is returned by four vessels to the *left* side of the heart, by which, as at first described, it is again sent over the body.

The chest itself is divided into two parts by a thin membrane, stretching from the centre of the breast-bone to the back, thus forming as it were two distinct apartments: in one of which (the right) is placed the right lung, sub-divided into three portions or lobes; in the other (the left side) is situated the left lung, sub-divided only into two lobes, the heart occupying the remaining space. Through this spongy substance the air we breathe penetrates by the wind-pipe at the end of the neck; this pipe divides into two main branches, one to each lung, and these again sub-divide into as many others as there are lobes (as already mentioned), and these sub-divisions themselves are still more minutely divided into numerous others, never yet *fully described.*

We have already said the pulmonary artery brings the blood from the right side of the heart to the lungs, to be purified; and we find where a branch of the pulmonary artery in the lungs diverges from the main trunk, it is accompanied by a similar one of the bronchia or air-tube. At first sight it would appear probable, from their juxtaposition, that there is a change effected in the blood in these large branches, and not, as is generally supposed, solely in the most minute vessels. How can we account for the oxygenation of the blood when a considerable part of both lungs are rendered impervious to air, or when these minute vessels are in a state of acute

inflammation? or why does not suffocation take place *at once*, in an animal, upon injecting a considerable quantity of water into his lungs?

It has been truly said, the medical is a conjectural art: every disease, no matter how well known—every remedy and its application (so much depends upon judgment)—forms a distinct history.

Many of *our* facts resemble conjecture rather than truth: thus it is generally said, the expansion of the chest is effected by the contraction of the intercostal and other auxiliary muscles; but there is another power which has not been properly noticed, namely, the pressure of the atmosphere; for if we cease to inhale air, the chest will cease to rise, and all the united powers, called inspiratory, will not produce it. The free *admission* of air at once effects it.

We shall further on have to notice this circumstance, as one of the occasional results of acute inflammation of the lungs is to render a considerable part of them impervious to air, and consequently, prevents a proper elevation of the part of the chest so affected.

This propelling of the blood in a state of purity from the left side of the heart over the whole body through the arteries, and returning to the right side by veins; thence through the lungs to be purified, previous to being sent over the body by the left, is what is called the circulation. By this wonderful contrivance all the blood in the body passes through

the lungs in health every three or four minutes, and this machine keeps up this continued action day and night, for seventy or ninety years together. There are other powers and peculiarities belonging to both heart, arteries, and veins; allusion to which here would, instead of explaining, only mystify the subject. It is sufficient here to say, that the air which is necessary to support flame is indispensable to the support of life; that whilst it changes the blood in the lungs from dark to vermilion, it undergoes a change itself; that this change renders it unfit to be again respired; that how those changes are effected is still very imperfectly understood; that respiration is most probably the source of animal heat; that a quantity of the watery part of the blood is sent from the lungs in a state of vapour at each expiration.

EFFECTS OF RESPIRATION.

It is known that during inspiration the blood comes readiest into the lungs, and that strong expiration not only assists the transit of the blood from them to the left side of the heart, but at the same time prevents, in a very important degree, during its continuance, the admission of an additional quantity into them: the fact is known to all, that any con-

tinued effort at expiration, whilst the air is kept confined in the chest, produces a redness, and, if protracted, a blackness, of the face. This happens *principally* because the dark venous blood is thus prevented returning into the lungs.

It is also known that an animal hanging can, by repeated efforts of expiration, send the air from his lungs ; but his inability to inspire, quickly produces their collapse, and thus prevents the blood passing through. In such cases, after death, the right side (ingress) is loaded with blood, whilst the left (egress) side is comparatively empty.

It is further ascertained that by passing a ligature over the windpipe of an animal, and preventing the escape of air contained in the lungs, thus keeping the air-vessels distended, prevents a collapse of the blood-vessels ; the blood flows freely through, and after death quite a *different result* is produced, namely, the left (or egress side) is found fuller than the right side of the heart*. Results similar to this was found by distending the air-cells with water.

The celebrated Majendie mentions an experiment he tried upon this subject ; he introduced a tube into the jugular vein of an animal, and made it penetrate as far as the heart ; the blood was seen to flow by the tube only in the moment of expiration†. In

* Coleman on Suspended Respiration.

† Vide Barry's Experiments on Atmospheric Pressure.

inspiration, on the contrary, the air was drawn forcibly towards the heart. The same thing is observable in the slaughtering of animals: the blood gushes out like a fountain at every expiration; the last effort to assist the hold of life—the last sigh—is an expiration.

A person bleeding from a vein, we know, if he blows strongly, the jet of blood will visibly increase; and, if it comes from an artery, it will be much more obvious. A person having a boil will feel additional pain by an expiration, or by lifting a weight, sneezing, running, crying, in fact, any thing that produces violent or continued expiration. If a fat unexercised horse is galloped to what, in sporting phrase, is termed a "stand still," it will take five minutes or more of perfect rest to reduce the oppressive breathing and congestion thus established; but on opening the two jugular veins the recovery is *instantaneous;* the equilibrium is at once restored, the quantity of blood in the lungs is diminished, and the volume of air increased.

Thus it is manifest that the atmospheric pressure, which aids in raising and enlarging the chest, must, by its counter-pressure on the blood within the lungs, in the act of expiration, assist to expel it. It would appear necessary to have some other assistance to send the blood through the lungs than what is furnished by the action of the heart and pulmonary artery. Here the inhaled air furnishes a mechanical

pressure to the blood-vessels of the lungs, somewhat similar to that produced by muscular action in other parts of the body.

The knowledge of *every fact* relating to the physiology of the lungs is of importance; some of these we have been speaking of were long since known, and have been overlooked as *merely curious;* others, if known, were *not expressed.* Believing their correctness to be quite capable of proof, I am satisfied their application will be found of great utility in any deliberate physiological inquiry into diseases of the lungs.

We find, when the receptacle for air in the lungs is diminished by inflammation or otherwise, there always occurs an impaired power of respiration. The same circumstance frequently happens in persons of deformed chest: for although such persons have a power of increasing the flow of blood into their lungs by exercise, they have not, at the same time, power to inhale a proportionate supply of air: hence they attempt to supply the want of volume by an increase in number of their inspirations, and thus attempt to restore the equilibrium of air and blood. The substance of the lungs, like all other parts of the body, vary by age, action, or disease. In persons who cough a great deal the air-cells are enlarged; the specific gravity of the lungs, like the bones, diminishes with old age.

Magendie found a piece of lung, taken from a man

sixty years of age, fourteen times lighter than a portion of a similar size taken from a child*.

The lungs have been generally considered passive, at least in ordinary respiration. Laennec was of opinion that they have an inherent power of action.

POWERS OF GENERATING HEAT AND COLD.

It may not be superfluous here to mention that persons of narrow chest are generally what is termed delicate, and *vice versa*, that the full-chested not only are not so liable to many diseases (particularly those arising from debility), but that when attacked have superior powers of restoration, arising, in a great degree, from their being enabled by the larger size of their chest to inhale a greater quantity of air. The quantity of animal heat we generate appears to depend upon the quantity of oxygen (vital air) inspired. Knowing this, we can account for the power man possesses of resisting exposure to an atmosphere heated 50 or 60 degrees above boiling point†, without the heat of his body rising more than 3 or 4 degrees.

* Journal de Physiol.

† Dr. Blagden's Experiments, Phil. Trans. vol. vi. p. 5.

In ordinary respiration and temperature heat is generated by the air we inspire, whilst, at the same time, there is a quantity of the watery part of the blood exhaled in form of vapour, producing some *loss of heat* at each expiration; but when the living body is exposed to this high temperature, an additional process of generating cold, or losing heat, is set up: in the first place, as we know the air we breathe has a power of expansion by heat, it of course follows, that the same bulk of warm air cannot contain an equal quantity of oxygen as a similar bulk of cold air; therefore, the usual power of generating *heat* is diminished, and a negative power of producing cold is set up, and this power is directly increased by the additional quantity of vapour exhaled from the lungs and profuse perspiration.

The human body, although surrounded by an atmosphere which is frequently 50 degrees lower than itself, yet, by this superior power of generating heat with cold air, it is still enabled to resist the quick abstraction of heat, and preserve its own temperature. There have been numberless speculations about *how* the change is effected in the blood passing through the lungs. The various experiments that have been tried to explain the *modus* have at least established one fact, namely, that we can find no substitute for pure atmospheric air.

Those animals whose respiratory organs are small, in proportion to the size of their bodies, consume

but a small quantity of oxygen (vital air). Hence the temperature of their blood is found to vary with the medium in which they live; but, on the contrary, those animals whose lungs, proportioned to the size of their bodies, are largest, consume the greatest quantity of oxygen, and in health have generally a uniform temperature.

INFLAMMATION.

As we shall have frequently to speak of that alteration in the system known by the term inflammation, without entering into any speculative opinions on the subject, it may be necessary to allude here to those powers which are immediately concerned in its production. At the head of the system called nervous stands the brain, from which and the spinal marrow white fibrous cords called nerves arise, and convey different species of living power to various parts, for motion, respiration, and sensation.

Much as the genius of Bell, Brodie, and others, have effected by their inquiries, the physiology of the brain and nerves would still appear placed beyond the reach of human exposition.

The nerves are considered the vehicles of sensa-

tion and volition to the various parts of the body. They also convey impressions back to the brain, which produce, according to their nature, corresponding actions upon the system in general, and circulation in particular—all tending to the preservation of health and life. The cerebral and vascular system—the brain and heart—are so intimately connected with each other, that neither can be materially affected without producing a corresponding effect in the other. Those vessels which, we have said, when speaking on the circulation, carry the blood from the heart over the system, in their course give off branches, which gradually grow less and less, and terminate so small as to be likened to hairs.

A somewhat similar change of size takes place in those nervous cords we have been just now describing. The fine terminations of those vessels and nerves are scattered over the entire body, and so minute are they in size, that a puncture from the finest pointed needle will at once rupture several small blood-vessels, and produce that most *useful* sensation called pain, by wounding some of these minute nervous filaments. An injury done to a part immediately affects its circulation—the pain produced through the nervous system influences the circulation; an increased quantity of blood continues to be sent to the part affected, the accumulation of which commonly causes swelling, heat, redness, and pain, which are the symptoms of that state

called local inflammation; and this accumulation, although at first but an effect, frequently becomes a cause, and by the local irritation it produces, occasionally changes from mere increased circulation of a part to increased circulation of the entire mass of blood.

INFLUENCE OF EXERCISE.

It may be necessary here to remark, that the various cavities of the body—the chest, abdomen, and joints—have fluids exhaled into them from minute blood-vessels, one of the uses of which is to prevent friction and irritation; but in no part, in health, can there be an over-supply or stagnation, for whilst those minute vessels pour out their secretions, another set of vessels, called absorbents, are constantly removing them back again to the mass of circulating blood.

The various secretions of the body are formed from blood: some are (perhaps improperly) supposed more simple than others; yet it would appear, however correctly we may judge of their individual utility, the *modus* by which they are immediately produced, neither chemistry nor physiology are likely to supply: by what process sugar is produced in the

stomach—wax by the ears—perspiration by the skin—or how the bee can secrete honey, or the spider thread—are equally miraculous, and the method of their production all alike beyond the reach of human explication.

Perhaps to *us* the most remarkable is that secretion which is poured out by those minute blood-vessels whose mouths terminate upon the internal part of the stomach, called the gastric juice. The wonderful power this fluid possesses of dissolving bone, enamel, and even reducing metals, when swallowed by some animals, is not more remarkable than the power which exists, at the same time, in the *living* stomach to resist its influence, and that, whilst it supplies a solvent that is capable of reducing most substances, itself alone escapes change.

It may suffice our present purpose to say, the food, after mastication, is sent into the stomach, where, by the action of the gastric juice, it is converted into a pulpy substance, which has been denominated chyme, and, as it progresses downward to the small intestines, it then still further changes its nature: it now takes the name of chyle, a milk-like fluid, and, in this state, it is drunk up by thousands of minuter vessels, whose mouths open into the small intestines; by them it is conveyed to the mesenteric glands; thence they continue their course, and terminate in a duct, which pours its contents

into the circulation—by this means the waste by the various secretions is supplied.

The means of supplying this waste depend upon a variety of circumstances. It is not only necessary that sufficient nutritious food should be regularly supplied to the stomach, but that the state of that organ should be such as to be capable of producing those changes necessary to be effected on it *before* it passes from it, and that similar powers should also exist in all the other organs concerned in chylification and digestion. Even the co-existence of all those circumstances are not sufficient of themselves to supply the constant waste of pure blood. If the lungs into which the chyle is sent are not capable of producing those changes in it which fits it to unite, and be sent with the general mass of blood over the whole body, these changes can only be effected, even in the healthiest lungs, through the agency of pure atmospheric air.

A deficiency of nourishment or of the powers of digestion, in children particularly, often gives rise to effects which *cause* debility and disease of those mesenteric glands we have already alluded to, known by the term mesenteric consumption.

Of all the means best calculated to preserve health, exercise is certainly the most natural and effectual. The immediate result of exercise is to quicken the circulation of the blood, to increase the action of the

heart, and thereby send the blood more rapidly over the body, and thus increase the various secretions; by this means digestion is promoted and appetite improved. The want of exercise, on the contrary, relaxes and enfeebles the entire frame. Even temperance, under such circumstances, will not ward off the consequences of impaired appetite and digestion; but loss of sleep, hypochondriasis, and the intervention of a train of nervous affections, evidently shew that a state of activity is as necessary to the preservation of our mental as of our bodily powers.

EFFECTS OF ACTION ON PARTICULAR PARTS.

It is a principle in physiology, that whatever action Nature intends for a part, that action alone is capable of keeping it in health; that over-action induces inflammation and its consequences, and that want of action does the same: for instance, whenever we find a joint, we at once conclude it intended for motion; deprived of that motion for a considerable time, it ceases to be a joint—it becomes a fixture.

The loss of natural power in muscles from paralysis, whilst it causes in them, from want of action,

great diminution in bulk and weight, likewise commonly produces luxations, absorption, and even morbid growth of bone, in those joints to which they were intended to give action. Want of action of a part establishes in it what might be termed a relative debility—that is, a debility disproportioned to the relative strength of the system at large.

We must bear in mind, however, that there is a wide distinction to be made between exercise and fatigue, and that what is natural action in health is often over-action in a state of debility. As general healthful action of the system adds to the general health, so particular action of parts (as we observe, for instance, in the increased size of the arm of the working blacksmith) gives additional power to the part to resist inflammation, and *vice versa.*

Every person is more or less acquainted with the effects of gymnastics.

Action gives to all parts intended for it increased circulation of blood, and, if in health, additional strength. Thus we find the muscles of the wings of birds of flight, as pigeons, are red, their legs white; the legs of domestic fowl much redder than their wings; the flesh of the deer, an animal of speed, redder than that of sheep.

The conclusions to be drawn here are:—

That the perfect health of the lungs, like all other parts, depends upon the *full* performance of

their natural action, both as regards the complete expansion of the organ itself and the purity of the air inspired.

That every continued deviation from full *natural action* is a step towards debility.

That this debility is of more importance in the lungs than most other parts, being the organ by which the blood is purified for the nourishment of the entire body.

That the same increased healthful action of the lungs, like increased action of other parts, adds to their vigour, and removes acquired or natural liability to debility and disease in that organ.

That on this principle only can it be accounted for, why horses and other animals made gradually to give additional action to the lungs acquire additional powers of speed.

It is not a little singular that animals so trained and exercised are never subject to pulmonary consumption, unless the rare disease produced by debility, resulting generally from neglect or ill treatment of some acute affection of the lungs, might be called by that name.

GENERAL EXERCISE.

Two hundred years ago Spigelius attributed the frequency of consumption in England to the habit of confining the chests of young women by tight dresses *. The same opinion was held by Diemerbroeck, a physician of Utrecht, who lived somewhat later, and has been supported by some modern writers.

From what we have already observed, when speaking of natural action of parts, of course we must admit the justice of the remark, any thing which interferes with the full expansion of the chest is certainly injurious to the natural action and health of the lungs.

Sydenham, Hofman, Juncker, and many other authorities, both ancient and modern, have recommended riding on horseback, and the elaborate Bayle says, he knows no remedy so useful as exercise to the consumptive.

Hippocrates and Galen, some twenty centuries since, recommended to the phthisical walking and running; but as they were not in possession of the anatomy or real use of the lungs, or the circulation of the blood on the subject, they have but little claim as authorities.

* Spigelii Opera, Amst. 1645, de Corp. Fabr.

It is a fact undeniable that the lungs, like all other parts, are strengthened by action, and that their want of proper action and *stimulus* produces debility; this being understood, its gradual increase and proper regulation is in the power of every individual.

Unlike the stomach, the lungs have but one species of stimulus, pure atmospheric air, and this bounteous Providence has bestowed alike on all. In using it constantly and abundantly we cannot err—our guide is Nature.

For young growing persons daily quick walking, and even occasional running, is far preferable to riding on horseback or any species of gymnastics whatever, for expanding the chest, preventing phthisis, and fully developing the perfect symmetry of the entire figure. It is not here intended to be conveyed that it is necessary to health to adopt the habits of a "professional pedestrian," to run like the racer—the pace of the hare was not intended by Nature to be rivalled by man. All animals of speed, anatomically speaking, exceed him in the capacity of sending blood quickly through their lungs. The horse, for instance, has eight pulmonary veins; man but four *.

* There are other peculiarities in the lungs of different warm-blooded animals and birds of flight, as well as in those which, by quick running, rapidly send their blood through their lungs,

Much as has been said and written in praise of what is called a state of Nature, still it cannot be denied that the natural state of man is nearly a state of art. In a barbarous as well as in a civilized state man is ever found to be dependent upon his fellow man—he is made for society—even in the most savage state he is found in communities. In his primitive simplest character he depends less upon the powers of his body than the resources of his mind: by an effort of his intellect he can procure fire, can clothe and shelter himself from the effects of climate, and, whilst his fiercest natural enemies are confined to particular spots and climates, man himself, the most helpless of animals, exists every where; but with all the intellectual comforts to be enjoyed from a state of society, which, perhaps, we can by no means properly appreciate short of their deprivation, it has also too often and too long produced the most baneful effects; the first and principal of which is the common necessity of inhaling impure air from improper ventilation of our dwellings.

Although now generally known that the air we once breathe is unfit to be again respired—that it is poisonous—yet how commonly do we find the fact

which appear to have been overlooked, or at least are not to be found in any elementary work on comparative anatomy read in the English school.

completely overlooked or disregarded? How commonly do we see an entire family of the educated and enlightened enjoying the *fresh air* for hours together in a close carriage? How often do we find the friends of a youth, on account of the delicacy of his frame and constitution, place him for years at some light in-door occupation, thus preventing him, from mistaken motives of affection, from giving his delicate lungs their proper stimulus of pure air and natural action—thereby debarring him of perhaps his only chance of attaining a healthy manhood?

EFFECTS OF GYMNASTICS.

Of late years considerable attention has been paid to the physical education of youth in this country. In a work on Gymnastic Exercise, as taught in the gymnastic institutions in Germany, 1823, we find the following remark: "Running is the fundamental part of gymnastic exercises, the strength of the *upper members* depending greatly upon that of the *lower ones*, and is therefore the first exercise with which the beginner should make himself familiar." Although the author is undoubtedly correct in making running the basis of his art, still, in supposing the strength of the upper part of the

body depends greatly upon that of the lower ones, he is very erroneous: the very reverse of this, both in health and disease, is the fact. The benefit derived from running, the first and perhaps the best of the five species of ancient gymnastics, is procured by giving habitual full action to the air and blood-vessels of the lungs, thereby giving them additional strength to perform their functions, and, as a necessary consequence, *diminished susceptibility* of disease. All are aware that, in any attempt to run by a person not used to it, the extremities do not give way, the legs do not become fatigued first:—No! the lungs, from want of sufficient action, are incapable of getting rid of the extra quantity of blood; a temporary congestion ensues; the natural equilibrium between the air and blood in the lungs is lost; and not only the lungs themselves, but those muscles immediately concerned in the process of respiration, are alike unable, for similar reasons, to send the blood from the lungs. The requisite power can only be obtained by additional action of *the part*. Attention to this latter circumstance has been, as far as I can observe, much overlooked by most gymnastic teachers in this country. It should be recollected that no exertion of strength, no violent effort at raising and throwing of weights, &c., is accomplished without shutting the epiglottis, and the exertion of powerful pressure of the confined air on the blood in the lungs, the effect of which will be dangerous just in proportion

as their quantity of contained blood is great, and as the blood and air vessels have been used to a state of comparative inactivity.

Violent efforts, under such circumstances, have frequently produced mechanical rupture of some of the blood-vessels and sudden death.

Gymnastics are of such ancient origin as to be almost coeval with society itself. They were used by the ancient physicians for the cure of diseases; they formed the games of the ancients, and were eventually mixed up with their religious ceremonies: first in order was the foot-race; second, leaping; third, wrestling; fourth, throwing of blocks of stone; and, fifth, boxing. A reversion of this order of gradation would completely destroy the "principle" of the art.

In health habitual exercise gives increased vigour to all parts included in the vascular system; but perhaps, most particularly, by giving additional tone to the blood-vessels, it adds to the strength and power of the lungs, *whether* that resides in their resiliency*, elasticity, or what has been by some termed their inherent power of action.

By the nice adjustment of the propelling with the resisting power of the blood-vessels, to which exercise so materially contributes, the blood can at any time, by quick action, be transmitted with increased

* Dr. Carson's Experiments on the Resiliency of the Lungs.

velocity, and yet none of these vessels contain a greater quantity of blood than usual. Hence the liability to congestion and inflammation of the pulmonary apparatus, so certain to occur to those of habitual inactivity upon any thing approaching to violent action, is materially obviated, if not completely removed, by well-regulated habits of exercise.

LUNGS UNDER DISEASE.

We now turn from treating of the lungs in a state of health to a consideration of them under disease.

It may be here necessary to say, the lungs, generally speaking, are not much susceptible of pain, although the extremely thin membrane (pleura) covering them is extremely so under acute inflammation. Hence it generally happens (with this latter exception occasionally occurring) that, in phthisis, they progress on to total destruction without causing much actual suffering.

The origin and nature of tubercles have given rise to a variety of contradictory opinions, and some very ingenuous, although incorrect, hypotheses. Whilst some considered them inorganic, and capable of producing irritation in the lungs, mechanically, others

held quite an opposite opinion. Dr. Mason Good considered them a species of monster growth; but such marvellous productions are extremely rare, whilst tubercles are so common as to give rise to a disease which, perhaps, forms one-fourth of the annual mortality of the kingdom.

Laennec says, "the progress of pathological anatomy has successfully demonstrated that phthisis is owing to the development of a particular species of accidental production, to which modern anatomists have restricted the name of tubercle."

Without attempting any classification of the disease, or noticing the different varieties of Bayle, Cullen, Laennec, and others, we shall only examine and endeavour to explain *one*, namely, the tubercular, which the concurrent testimony of authority has admitted, and morbid anatomy has proved, to be the chief (if not the *only* true species of phthisis); the other varieties, although differing in character and origin, being for the most part still tubercular.

Laennec says, "it is impossible not to admit an aberration of nutrition—an *actual* and *peculiar* change in the fluids—which gives rise to tubercles."

Dr. Alison considers that, in certain constitutions, chronic inflammation does frequently and directly lead to the deposition of tubercles. Many have supposed that the germ of the tubercle must of necessity have previously existed in the blood, and

only required an exciting cause to its immediate production.

M. Andral says, "if the disposition to tubercles be *very strong*, the slightest local congestion of blood will produce them; but, if there be no such predisposition, the most intense and longest inflammation *will not produce* a tubercle."

This latter assertion, I consider, on examination, will be found perfectly untenable. It is known that about one-fourth of the mortality of the kingdom arises from consumption. It is also notorious that thousands of these cases are the sequelæ of other diseases, both acute and chronic, in persons of every age, complexion, and shape.

Tubercles are frequently found in the lungs of persons who die of fever, and Laennec remarks, that severe continued or intermittent fevers would seem to be frequently the cause of their production.

Will it be said that amongst a population, living in the same climate, and constantly mixing by intermarriage, there does exist in any race or family an exclusive immunity from the production of tubercles on the intervention of an exciting cause? All persons are liable to a state of inflammation and debility; but not equally so. Debility being always the immediate cause of tubercles, whenever they occur, as all persons are liable to debility, so they are liable to tubercles; but not equally so. Hence,

whilst the robust broad-chested individual (not being so liable to debility) escapes their production with comparative impunity, the experience of hundreds of years has not falsified the remark, that the possessor of a fair complexion, light hair, blue eyes, slim person, and, *most particularly, narrow chest,* is quite obnoxious to them. Every individual is *naturally* liable to an attack of small-pox. The measles, small-pox, plague *, and several other diseases, can be produced by a matter, *sui generis,* the nature of which bids defiance to inquiry; but if tubercle exists in the blood, and the blood be thereby diseased, or as Russel has said, poisoned, will not inoculation produce either tubercles or phthisis? So convinced am I that they are not the product of diseased blood, that I would willingly submit myself either to the operation of inoculation or transfusion of the blood of a person attacked by *phthisis alone,* without any dread of the consequences—without any fear of producing either tubercles or phthisis.

* Vide fatal case of Dr. White from inoculation in Sir R. Wilson's History of the British Expedition to Egypt.

THE TRUE NATURE OF TUBERCLES.

The term cough is too well understood in this climate to require any definition here: it is known to accompany a great many affections, as pneumonitis, empyema, pleuritis, hepatis, &c., some of which are situate far from the seat of coughing.

The passage along which the air enters the lungs is covered throughout by a membrane that secretes a thick fluid, which at once serves the purpose of lubricating the air-vessels, thereby enabling them to effect the necessary change * in the contained blood, and at the same time protect the membrane itself from the stimulus of the inspired air; but in such acute affections as we have just named, the pain, acting through the nervous system, determines the current of blood to its seat, and thus deprives other parts of their natural supply. Hence the secretion of mucus in the lungs, under such circumstances, is diminished or suspended, and the membrane itself thus left unprotected from what has (in the language

* Venous (dark) blood, on being exposed to the atmosphere, becomes at once a bright red. A similar change takes place by placing it in a bladder, and not in contact with the air; but the process is much assisted by having the bladder moist.

of pathologists) now become a foreign body: the sensibility of the membrane is roused, and its frequent attempts at expulsion constitute what is termed symptomatic catarrh. A fact apparently corroborative of this opinion is, that, in pleurisy *, the cough throughout is dry: the seat of inflammation not being the mucous membrane of the lungs, there is no expectoration.

Let us suppose a person to have got common catarrh, the general symptoms are a sense of fullness in the head, caused by inflammation of the schneiderian membrane lining the frontal sinuses, in which the mucous membrane of the lungs commonly participates. The affection is generally attributed to sudden changes of temperature and suppressed perspiration, as immediate causes.

Generally speaking, continued exposure to cold does not appear to produce inflammation of the mucous membrane of the lungs; the action of cold lowers the circulation in *all parts*: hence it is, with apparent correctness, referred to the *alternation* of cold with heat, and *vice versa*.

The immediate effect produced by the sudden change of the atmosphere might be simply likened to the familiar effect produced, in an infinitely greater

* Inflammation of the pleura, an extremely delicate membrane, which covers the whole of the chest internally, and is also reflected over the lungs.

degree, by suddenly holding our hands to the fire, after exposure to the action of cold frosty air. We can readily imagine the effect produced by great and sudden increase of circulation in vessels previously *constringed* by the application of cold.

Without entering into the various opinions about *how* those different causes produce catarrh, we shall merely consider it as the effect of certain stimuli applied to a susceptible part, thereby producing inflammation, and the consequent increased secretion, as a kind effort of Nature, to relieve or remove it.—But, to continue the history of catarrh, if there be a sense of fullness and oppression of the chest, accompanied with fever, it takes the name of pulmonary catarrh. If the inflammation happens to be considerable, and the expectoration copious, the latter circumstance, combined with the then impaired power of the lungs properly to oxygenate the blood, induces commonly a visible loss of flesh. The occasional temporary nature of the attack, and remedies for its removal, are known to all; but, in delicate persons, there is a deficiency of power to *resist* the exciting cause: hence those attacks commonly follow upon the slightest exposure. The continued expectoration deprives the connecting cellular membrane interspersed throughout the lungs of their natural supply of blood. The consequent debility is followed by a deposition of coagulable lymph into the cellular membrane from the mouths of its minute exhalent

arteries—perhaps always, *at first*, little larger than a pin's head—this constitutes the tubercle. The gauze-like membrane called cellular, which forms the connecting medium between the skin and body, and is interposed between the muscles and other parts, is least of all able to resist inflammation: hence it is the general seat of abscess, and perhaps, for similar reasons, in it tubercles in the lungs, the result of debility in the organ, are generally first formed. The utility of their creation and existence, under certain circumstances, like all other acts of Nature, are not the less real, because not hitherto obvious. Their occasional production, we should conclude (even without being able to prove it), although in itself an evil, is intended to prevent a greater.

Tubercles are found in many other parts of the body, most commonly in the mesenteric glands of ill-fed animals of all kinds, as well as those of children of delicate constitution, arising from a similar cause—debility of the *organ* in which they arise. They are sometimes *said to be* found in the lungs of fat healthy sheep and lambs; but are scarcely *ever found in the muscles of voluntary motion.*

If a horse, in high condition, (or, more properly speaking, fat,) is driven with sufficient cruelty, he will readily get inflammation of his lungs; which, if neglected, will rapidly run through its different stages to a fatal termination. The lungs, after

death, will be found highly inflamed, and so heavy, from the gorged state of the blood-vessels, as to sink in water; but, in such cases, tubercles are perhaps *never* found.

However, if the inflammation is only partially arrested, which, from late application or inefficient remedies, occasionally occurs, the affection commonly puts on a chronic form. The animal sometimes will get a dry short cough, will lose his appetite and flesh, whilst his pulse denotes great debility and irritability. If the disease be allowed to proceed to a natural termination, it will be accompanied throughout with cough and purulent discharge from the nostrils; and, after death, the lungs (generally both) will be found filled with tubercles in every state—some hard, and some approaching to, or in a state of, suppuration. The species of tubercle called granular are, as far as I have remarked, generally present. The lungs of the animal, in such cases, present appearances very similar to those of the human subject after death from phthisis.

I have seen inoculation with the blood of an animal, under the worst stage of this disease, carefully performed in two different instances upon healthy animals, without producing any local or general disorder whatsoever. It has been said that tubercles can be produced by injecting an irritating fluid down the trachea of an animal. I have seen a solution of sulphate of copper applied in this manner

to two young asses by an expert operator, with results similar to those just described attending pneumonia—producing violent inflammation of the lungs, but no tubercles. However, in these experiments, the irritation and inflammation produced was extremely violent, and the animals being young and of weak texture, they therefore sunk at once under the acute stage.

Laennec says, " pneumonia has been produced in animals by injecting various medicaments into the veins." Now, as tubercular consumption occasionally follows, it would appear natural enough to suppose that its artificial production in an animal, and subsequent reduction to a chronic form, would dispose the lungs to formation of tubercles, and thus produce consequences similar to those sometimes arising from pneumonia occurring in a natural way.

Tubercles are frequently found in the lungs of persons who have died of pneumonia; but in such cases, Laennec supposed tubercles *always previously existed.* But to this general rule there will be found very numerous exceptions; for the persons most subject to pneumonia are, the robust, the broad-chested, just the reverse of those who have what is termed a predisposition to tubercles and phthisis; but they have no such immunity from pneumonia. It should also be recollected that the stage of the disease to which Laennec here necessarily alludes is subsequent to the use of extensive depletion, which,

in such cases, changes the acute affection, and disposes it either to resolution, or to assume the chronic form. When the robust and broad-chested are attacked by phthisis after pneumonia, tubercles are frequently the effect, not the cause, of the pneumonia; and I am quite confident that, in the very great majority of fatal cases, originating in pneumonia, the subsequent tubercles and phthisis owe their existence to injudicious treatment of the original disease, to which treatment we shall allude further on.

Simple temporary congestion, or over-fulness of the vessels of the lungs, is readily produced in man or any other animal, by quick running, particularly if not used to exercise. On cessation of that action the powers of the vascular system quickly restores the natural equilibrium; but these powers are unequal to the task, if that congestion is of long continuance or great extent. The distention, mechanically, stimulates the constant but abortive attempts of the blood-vessels to reduce the accumulation, and this prolonged congestion constitutes that state of the lungs called pneumonia *.

In pneumonia, by the laws of gravity, the con-

* Although this definition of pneumonia applies more properly to the horse, the only domestic animal we have that *can* be forced to create the disease by mere continued running, still, in the human subject, the effects are similar, although produced by different causes.

gestion and inflammation of the lungs, if not confined to, must almost always commence at, their inferior part. If art does not remove this congestion by bleeding, or Nature reduce it by expectoration, abscess would be more likely to be formed there than tubercle. In such cases the formation of abscess is either retarded or prevented by bleeding, or by the copious expectoration which generally occurs.

When inflammation takes place in the cellular membrane of the lungs, the usual formation of abscess in it, which generally occurs under similar circumstances in other parts of the body, is very rare; so rare, indeed, that Laennec says, that "out of hundreds of peripneumonic cases, he only met five with simple collections of pus." He is borne out in the remark by Dr. Bright (in his Report of Medical Cases, p. 134), who says, "he only met one unaccompanied by tubercles."

"The vomica of our practitioners," Laennec says, "is the softening of a mass of tubercles in the lungs."

We know that a part approaching to, or in a state of, suppuration, can be occasionally assisted in, or prevented from, taking on that process: that whilst antiphlogistic remedies retard the one, the phlogistic accelerate the other. The *reduction* of the inflammation in the cellular membrane, to which we here allude, is commonly effected by the subsequent (shall we say sympathetic) inflammation of the mucous

membrane. The copious drain commonly produced by expectoration in pneumonia, or from pulmonary catarrh, effects the same end as local bleeding.

This natural antiphlogistic or depletive process prevents the otherwise inevitable formation of pus in the cellular membrane; but whilst it removes inflammation, its continuance produces debility of the entire organ. The cellular membrane thus prevented going through the natural stages of healthy inflammation by the usual order of adhesion, ulceration, and suppuration, in this state of debility (as before remarked) a deposition of coagulable lymph* (tubercle) occasionally takes place from its minute vessels, somewhat similar to cataract, and, like it, produced without pain, always organized, always preceded by inflammation, and, like it, subject to its laws†.

Laennec says, "the matter of tubercles may be developed in the lungs or other organs under two principal forms, that of insulated bodies and interstitial injection or infiltration. The insulated present four chief varieties, which I shall denominate

* Lymph is that constituent of the blood which forms cicatrixes, unites parts separated, as wounds, &c.

† This termination of pneumonia applies to the *delicate*, whose lungs *sometimes* only require a certain degree of additional debility as an exciting cause to the production of tubercle, and which debility is occasionally supplied and established by the occurrence of pneumonia.

miliary, crude, granular, and encysted. The other form, the tuberculous infiltration, offers three varieties, which I term the irregular, the grey, and the yellow."

My experience has not enabled me either to confirm, question, or correct this classification of Laennec, neither do I think it probable that *post mortem* examinations of the human subject *alone,* no matter how extensive, can ever enable any pathologist satisfactorily either to confirm his, or substitute a better, so long as we know such examinations are made on, and with few exceptions, confined to those persons, who have gone through the last stages of phthisis.

In the abstract, I consider this classification but of minor importance. I consider all tubercles of the same nature, although, like the different species of cataract, unaccountably found differing in colour and consistence.

Morbid anatomy has proved, that whilst one part of the lungs remain in a state of comparative health another will be frequently found affected with disease. It would appear certain that, under particular circumstances, some parts of the lungs are more susceptible of the production of tubercles than others. Morbid anatomy and auscultation would also seem to have proved, that tubercles, with few exceptions, are first and principally formed in the superior part of the lungs. But what constitutes this greater liability to their formation there? We know the ex-

tremities of the body are not so capable of resisting inflammation as those near the heart. Are we to conclude there are different degrees of strength and power of resisting inflammation in different parts of the lungs, depending on *other* cirumstances? We have already said tubercles are not *directly* produced by acute inflammation of the lungs. Knowing that, in pneumonia, the congestion, by the laws of gravity, occupies the lower part* of the lungs, is it probable the consequent *presence* of local inflammation suspends the formation of tubercle there; and that, on the contrary, the *absence* of congestion and inflammation, and existence of debility, in the superior part, under the same circumstances, there excites their first production, as in almost every determination of blood to the lungs, particularly when accompanied by a visible difficulty of breathing, there is more or less congestion proportioned to the extent of the determination, and as the lower part of the lungs is the seat of that congestion, are not similar effects, varying in degree, then produced in the lungs to those alluded to as occurring in pneumonia?

It has been found hitherto impracticable to trace absorbent vessels in the brain, yet few pathologists will admit their non-existence. It is difficult also to

* To this general rule there are said to be some exceptions; but there is occasionally a similar exception to the first seat of tubercles.

trace blood-vessels even in a common cicatrix, and impossible to point them out in cartilage; yet none questions the vascularity of either. Their existence in tubercles has been supposed and asserted by numerous authorities: but when they have been heretofore looked for, most probably, not only the tubercles themselves, but their vessels were in a state of inflammation and suppuration. From the history of the production of tubercles, their existence under health, and their destruction under disease, I am confirmed in the opinion that they are not a foreign, but an organized body,—because they are not peculiar to the lungs alone, but are produced indirectly by inflammation (generally arising from debility) in various other parts of the body,—because, like other organized parts, they are stained yellow by jaundice,—because they are found capable of adhesion,—because they are subject to suppuration, and, as life must come from life, suppuration being an act of life, therefore they are organized. Being thus organized, experience justifies the expectation, that, if the general health of the individual in whose lungs tubercles have been recently formed is preserved or improved, they will occasionally remain there without interruption or increase for a length of time, and if all these circumstances co-exist, may be eventually absorbed.

A quantity of tubercles were found in the lungs

of a pugilist *, who, although copiously and repeatedly bled, died a few days after his fight. Now the circumstance of a man being capable of bringing himself into a state of health and strength, rather above par, argues, that the machine which purifies the blood was in good health at the time, tends to prove either that the tubercles previously existed, and, being undisturbed by inflammation, did not at all interfere with the general health, or that they were the sudden consequence of debility in the lungs, induced by their previous inflammation.

The principle of newly-formed parts from imperfect organization being more liable to inflammation than old partly explains why tubercles, particularly in the lungs, are so liable to inflammation and suppuration; and this liability is materially increased by the circumstance of their being produced and nourished by an organ in a state of actual and increasing debility; and, further, by the nature of the organ itself being above all others of the body most liable to sudden changes from variations of temperature.

* Byrne.

EFFECTS OF INFLAMMATION OF THE MUCOUS MEMBRANE OF THE LUNGS.

The occasional existence of catarrh previous to a development of tubercles in the lungs, and its almost uniform subsequent intervention, have been productive of consequences not hitherto properly understood or appreciated. Independently of catarrh the lungs are frequently reduced, by other circumstances, to that state which favours the production of tubercles. As a general rule, to which I can name no exception, when tubercles inflame and suppurate there is *always* present cough and expectoration. Laennec has particularly remarked, "that we rarely ever meet with a case of phthisis, which arrives at a fatal termination, without exhibiting, after its nature has become clear, an abundant catarrhal expectoration." He again says, "of all the occasional causes which can give rise to a considerable development of tubercles, *the most frequent, most powerful, most evident, is the softening of a certain number of tubercles already in existence;* since we know it is at this period that the secondary eruption of numerous tubercles takes place in the lungs."

Knowing that the suppuration of tubercles in the lungs can be promoted by common or pulmonary

catarrh, and, further, knowing that the debility thereby induced is the common immediate cause of their increased production there, it cannot be denied that the same cause, which is found thus capable of producing the second eruption of tubercles in the lungs, when existing, is also capable of their first production. We must conclude, that, if the effects of common or pulmonary catarrh can produce tubercles in the second instance, they are also capable, in particular constitutions, of producing them in the first. The second eruption of tubercles is by far more numerous than the first, depending, perhaps, upon the *increased debility* of the organ itself.

Laennec, although so well aware of the usual consequences of the softening of tubercles in the lungs, goes on to say, " when we have ascertained the existence of tubercles, the second indication would be to *promote* the softening and evacuation of the existing crop ; the first to prevent the secondary eruption of tubercles ; as, in this case, if the primary tubercular masses were not extremely large and numerous (which they seldom are), a cure would necessarily take place *after* they are softened and evacuated.

By referring back to page 31, we shall find Cullen has taken a much sounder view of the subject : he considered that Nature occasionally effects their absorption ; but that cold, by producing inflammation in them, prevents that process taking place.

Laennec "considers the actual cautery and issues would seem to present the most rational means for preventing the formation of tubercles as well primarily as secondarily. However," he continues, "it is but a very small number of patients that will submit to a mode of treatment so horribly painful. Blisters are a very inefficient substitute for the searing-iron;" yet, he admits, he "found no benefit, in any case, where these methods were employed."

Unhappily for science and humanity, Laennec himself went through all the stages of the disease, and has thus left room for us, by his own death, to question the correctness of some of his conjectures.

As a general rule, we must suppose (independently of predisposition), that the individual in whom tubercles exist is thereby additionally exposed to those causes which produce inflammation of the mucous membrane: hence such persons are constantly affected by changes of temperature. In them the effect of catarrh is, to partially interfere with the purification of the blood in the lungs; but the most important mischief is produced by a copious and continued supply of mucus from the membrane lining the air-passages. By it those newly-formed ill-organized productions (tubercles) are deprived of their natural supply of blood; this, consequently, induces a degree of inflammation in them, which generally terminates in the same manner as in

all other organized parts similarly circumstanced, namely, suppuration. In this way, the same inflammation and debility which originally excited the production of tubercles, subsequently occurring, causes them to suppurate. It is quite evident, that so far from the production of copious expectoration and eventual suppuration of tubercles, as supposed by Laennec and others, being useful, it must be quite the reverse, as the same debility which induces suppuration, and to which debility, in turn, suppuration itself adds, whilst it destroys tubercles in one part of the lungs, by increasing the existing debility, must give rise to tubercles in another.

Laennec says, "death almost never takes place from any number of tubercles alone, unless they are in such a state of softness as to have their contents discharged into the bronchi, and consequently leave an ulcerous excavation."

When inflammation attacks a cluster of tubercles, the pus secreted in them forms what has been called a vomica, the contents of which, by the ulcerative process, finds its way to the bronchi, where, by stimulating the air-passages, it produces cough, and is finally expelled by the mouth.

A modern authority has proposed a novel mode of healing these cavities in the lungs: he says, "by expanding the lungs, the small cavities already formed will have their surfaces soon brought in contact, so as to heal by what surgeons term the

first intention." But this conclusion is not exactly correct: if an incision be made in an inflated lung out of the body, the parts, instead of being brought in contact, will be separated just in proportion to the degree of inflation, and only after expiration will they come in contact. The same circumstance must occur in the living lung; but, even if they were in contact, the lips of an old suppurating excavation never did or could heal by the process called first intention. When such wounds heal, and the cicatrices commonly found in the lungs shew they occasionally do, the healing process must always commence from the centre of the wound, not its sides. On what principle expansion of the lungs may aid the healing of these cavities, we shall allude to further on.

Dr. Carson, in his very ingenious work upon the Resilient Power of the Lungs, recommends, in order to bring the surfaces of ulcers in either lung in contact, not to permit the expansion of the diseased lung, but to produce its permanent collapse, by making an opening into the cavity of the chest. He, however, candidly mentions two cases of signal failure. A strong objection to the admission of air into either cavities of the chest would appear to be, that the collapse of the lung, in a great degree, by preventing the proper return of whatever blood might be sent into it, would thus produce an irri-

tation sufficiently strong to interrupt the healing of the wound.

Laennec says, "a cure may take place in two ways, after the formation of a vomica (just described): first, by the cavity becoming invested by a new membrane, analogous to some of the textures of the body—healthy; secondly, by the obliteration of the excavation by a cicatrix, more or less complete, consisting of cellular or cartilaginous substance."

There is nothing of supposition in this termination; for it is just a description of what is occasionally found to occur after the death of persons from various diseases, who were long previously attacked with all the symptoms of phthisis. But when there is a vomica, or perhaps several in the lungs—when emaciation and debility is great and of considerable standing—there is not present in the blood the power of forming a cicatrix: for, in extreme debility, the deficiency of lymph prevents the healing of wounds (even superficial): thus, in some excavations, occurring in cases which had lasted several years, there are found some cicatrized, and others, from the debility of the system, utterly unable to produce it.

Perhaps, in the catalogue of human diseases, there is no affection so analogous to common catarrh as the affection of the eye, called catarrhal ophthalmia. They are both the effects of inflammation in mucous

membrane: one of the conjunctiva, the other of the membrane lining the lungs. Both are commonly produced by similar causes, and almost uniformly recover by similar remedies.

Cattarrhal ophthalmia differs from purulent ophthalmia rather in degree than any other essential point. A somewhat similar difference exists between pulmonary and common catarrh.

Neglected purulent ophthalmia, in the adult, begins in the lining membrane of the eyelids; the whole texture of the conjunctiva swells, and from this altered surface, there is secreted a puriform discharge; nearly a similar change, and similar consequences ensue in the mucous membrane of the lungs from pulmonary catarrh. But from the extreme sensibility of the eye, and very limited size of the membrane affected, its suppurative process alone is not sufficiently copious to arrest the progress of the inflammation: hence, in neglected cases, ensue ulceration of the cornea, and eventual deposition of lymph, producing adhesion of the iris, opacity, and blindness; whilst, on the contrary, the secretion, in pulmonary catarrh, (chiefly depending on the superior extent, and, I might add, inferior sensibility of the membrane affected,) being copiously supplied, by this natural depletion, the inflammation is reduced, and ulcerative absorption prevented: but this extensive power of the mucous membrane, which enables it not only to relieve, but which is also the *natural*

means for subduing the most violent species of pulmonary disease (peripneumony), too often forms an exception to the general efforts of Nature; for, although it relieves, it also too commonly destroys.

The whole history of pulmonic disease abounds in proofs of the mischievous consequences of continued inflammation of the mucous membrane of the lungs—the part that suffers most is the weakest—the cellular membrane. In the first attack of phthisis, the disparity of power to resist inflammation, in the different tissues of the lungs, is not great: hence the semi-acute pain noticed in the pleura, in the first stage, which is soon relieved by expectoration, and which rarely again occurs throughout the disease. Pulmonary catarrh may exist for a considerable time without producing fever or emaciation, but, if tubercles, in any quantity, exist in the lungs, previous to, or during such an attack, fever and emaciation quickly ensue.

In that species of atrophy, called *Atrophia inanitorum*, commonly caused in nurses by continuing to suckle too long, pulmonary catarrh does not occur as in phthisis, either as cause or effect of tubercles. The disease itself differs from true phthisis, in nature and termination, only in the absence of tubercles and purulent expectoration.

EFFECTS OF INHALING WARM VAPOUR ON TUBERCULATED LUNGS.

Sir Arthur Clarke, in an Essay on Pulmonary Consumption, the professed object of which is to excite inquiry, recommends the inhalation of iodine in a state of vapour, which, he says, "powerfully *promotes* expectoration, absorption, and softening of tubercles."

Sir Charles Scudamore likewise strongly recommends, in consumptive cases, the inhalation of iodine and conium, which, he says, "although medicines of great delicacy and power, my conviction of their most perfect safety has not been shaken by a single untoward instance." We quote the following:—

> "*Case, No.* 1.—*Phthisis, in a young man, in the last stage, the treatment adopted with the hope of mitigating the symptoms, as the disorganization was evidently too extensive to allow of any probability of cure.*

"In this case the pulse was 120, inspirations 30, and the expectoration somewhat resembling ill-conditioned pus, amounted to more than half-a-pint per day. A weak solution of iodine, with the addition of some saturated tincture of conium, mixed with

water of 120 degrees of heat, was prepared, from which the patient inhaled for fifteen to twenty minutes three times a day: he soon found great relief, the power of expectorating being *remarkably facilitated*, and, by continuing this treatment, in a fortnight, the pulse was lowered to 100;" but, Sir Charles adds, "he got a relapse by exposure to cold, and, in two months after the first inhalation, died."

He candidly admits his having met similar results from this treatment in all advanced cases.

"*Case, No. 5.—An ulcer in the larynx, with tubercles in the apex of the lung, in which the good effects of iodine were well exemplified, although the termination of the case was fatal.*"

"*Case, No. 7.—Empyema, with tubercles in the lungs, same treatment, and similar results.*"

"*Case, No. 6.—Phthisis pulmonalis cured by inhalation.*"

Dr. James Murray, in his Essay on Humidity and Inhalation of Iodine, strongly recommends the latter: "it will," he says, "sometimes heal, if early applied, and it will give rest, repose, and relief, when it is impossible to cure." He mentions the case of a Miss R—— "at the time far advanced in phthisis:

she commenced the process of inhaling, by previously using the simple vapour of warm water, in order to lessen the irritation: she afterwards inhaled from water heated up to 160 degrees, through which there was diffused some iodine, and continued the application for an hour. In some time afterwards she inhaled from water with an increased quantity of iodine: her pulse at the beginning 88, her breathing 18; after inhaling for fifteen minutes it raised to 100; in thirty minutes pulse 115, breathing 22; half an hour after the cessation of this inhalation, the pulse, which at the commencement was 88, fell down to 78."

This inhalation of warm vapour produces what with some is the grand desideratum, namely, immense expectoration; but it should be recollected that this again certainly produces weakness: the increased secretion is produced from blood, and that blood abstracted from a part in a state of the greatest debility, instead of thereby leaving the organ in a better state than before the application, it leaves it more exposed to the attacks of the disease, with diminished powers of restoration.

But to follow up the remark that the pulse was lowered—a question here suggests itself—did it remain lower*? and if so, why not persevere with

* The same night after this inhalation, the fever was high, pulse rose to 128; sputum decidedly purulent, cough more

the application until it destroyed both hectic and its cause? The truth is it did or could not; but the loss of blood and strength, from increased expectoration and perspiration, induces such debility, that the experiment could not be performed daily, and, in the latter stages, could not be at all attempted.

The same lowering of the pulse can be, in most cases, temporarily effected by blood-letting, if it were not mischievous.

Dr. Badham says, "in bronchitis the inhalation of warm vapour generally occasions fatigue, and that it is inexpedient where the respiration is already laborious and painful."

"Bleeding," says Laennec, "ought never be resorted to in consumption, except to remove *active* determinations of blood, with which the disease *may* be complicated; beyond this its application tends to a useless loss of strength."

Heated atmosphere (that is such a heat as will produce any thing approaching to a similar effect) is bad; instead of restoring strength, it would only still further increase debility; instead of curing the disease, it would rapidly accelerate a fatal termination.

Syncope, or fainting, after bleeding, is known to be relieved by the resumption of the natural action of the heart and arteries, which has been simply and

frequent; loss of sleep, and the patient was troubled with frequent sighing and dejection of spirits.

correctly termed reaction: but persons who have been subjected to repeated blood-letting acquire, what Dr. Hall * terms, a morbid frequency or excessive reaction. A similar state of excessive reaction exists in advanced cases of phthisis, occurring principally, perhaps, from a similar habitual drain of blood by the secretion of perspiration and purulent expectoration, which, I am quite inclined to think, has been, and is, commonly mistaken for inflammation: hence the periodical use of the lancet, in the *course* of phthisis, by many practitioners, which, although it temporarily relieves it, at the same time, *adds* to the morbid efforts of the vital powers, and eventually terminates in sinking and death.

In every case of tubercular phthisis these effects will be greatly accelerated by the use of those remedies which increase the determination of blood to the lungs, the most powerful of which is the direct application of warm vapour to them, and this remedy, of all others, is best calculated to mislead the judgment, as all the symptoms are thereby temporarily relieved, but relieved at the expense of the constitution, and, if persevered in, of life.

The utility of iodine is not yet fully established or understood: if *at all useful* in tuberculated lungs, its direct application to the seat of disease would certainly appear to be only justified at a low temperature.

* Vide Dr. Marshall Hall's Medical Essays.

There is some degree of analogy to be observed in the effects produced by warm atmosphere upon our domestic animals: if, for instance, we take a healthy young colt from the field, and confine him in an ordinary *comfortable* stable, it will be found, in every such instance, without exception, that, within two or three days, he will be affected with cough and discharge of mucus from his lungs, which, if it is wished to increase, it is only necessary to leave him there, or remove him to a *warmer* atmosphere: if he is thus treated, and in flesh, he will probably get pneumonia, which again, if neglected, may terminate as already alluded to in page 71. It may appear singular that similar consequences rarely occur in the healthy animal, on sending him from warm atmosphere to cold, from stable to the field.

It has been also long matter of notoriety that recruits, who have been previously used to a country life, are almost uniformly attacked with catarrh upon first going into barrack.

INDISPENSABLE REMEDIES TO BE EMPLOYED ON THE FIRST APPEARANCE OF PHTHISIS.

We now come to speak of the cure of phthisis: to that end the following indications have been proposed by authors and attempted to be fulfilled by numerous practitioners:—

1*st. Indication, to prevent the secondary crop of tubercles.*

2*d. Indication, to promote the softening of the existing crop.*

3*d. To cicatrize the excavations produced by the softening of tubercles.*

The first indication is certainly good, and I believe practicable: but, by referring back to page 81, we shall see the fulfilling of the second indication would certainly prevent the completion of the first, and almost as certainly that of the third.

No medicaments have been found capable of softening tubercles. We do know their softening can be effected by those means which produce a determination of blood to the lungs, such as warm vapour, catarrh, &c.; but we as certainly know that the additional debility thereby induced, produces, perhaps, in *every instance,* a fresh crop of tubercles; whilst, at the same time, the poverty of the blood from hectic, and the inflammation and suppuration of each successive crop of tubercles, deprives the lungs of the power of forming cicatrices.

When tubercles are forming in the lungs, but have not advanced to suppuration, they are attended with a slight cough, with occasional difficulty of breathing, with the feeling of slight pains in some parts of the chest, and with pulse somewhat accelerated. "These," says Baillie, "are the symptoms which commonly usher in phthisis, and are fre-

quently overlooked by the patients themselves and their friends."

Under such circumstances, agreeing with this authority, that tubercles are organized, our great object would be to *prevent* their inflammation and suppuration. The primary symptoms, to which we here allude, are *always* accompanied by a determination of blood to the lungs, which determination, as the disease advances, amounts to a degree of congestion, such as the lungs, in health, could readily overcome, but which, in their present state of debility, they are unable to effect, and which congestion perhaps, in all such cases, is *prevented from increasing* by a copious expectoration. Considering the inflammation of tubercles as the *immediate cause* of phthisis, every effort should be made to arrest the inflammation and reduce the congestion. Without accomplishing this end, all other remedies will prove unavailing; for all the means hitherto employed to arrest the progress of emaciation and hectic, by merely attending to *effects* of the disease, have proved perfectly nugatory. Opium *, whilst it lessens ex-

* But little medicine is requisite or can be borne in phthisis. However, as the object of this Essay is an exclusive consideration of principles, the author feels himself neither inclined nor justified in offering an opinion upon any particular article of the Materia Medica to be employed in any stage of the disease—that being the exclusive duty and privilege of the authorized practitioner.

pectoration excites perspiration; and, again, the suppression of perspiration, in the same ratio, *produces* diarrhœa, and these effects will alternate and increase so long as the congestion, inflammation of tubercles, and expectoration exist. In such case, we must consider the congestion, although at first an effect, now to have become an additional cause of the inflammation of the tubercles and expectoration. We know the congestion to be, if not the sole, at least the principal, cause of the difficulty of breathing; for, on abstracting a certain quantity of blood, the dyspnœa is temporarily removed. We are further aware, if the patient, after such bleeding, increases his inspirations by exercise, he would at once increase the quantity of blood in his lungs, whilst his inspirations of air, instead of being increased in volume, would only be increased in number. The natural equilibrium of air and blood would be thereby still further removed than before, and a *return* of the dyspnœa, with increase of fever and debility, the necessary consequence.

As every step towards removing a diseased action in a part will be a means of assisting it to take on a healthy one, we are here justified in concluding, that, by removing the congestion and inflammation, if tubercles already exist, we thereby protect their organization, and prevent their suppuration and *increase*: if not previously existing, the same removal of congestion and inflammation will also prevent their

formation. Therefore *the indispensable indication to be fulfilled, in the early stages of the disease, is to remove the congestion and inflammation of the lungs.*

We are aware that, on making a deep inspiration, we can at will exert an increased power of sending blood through our lungs. We know that, by inflating the lungs of persons in suspended respiration, the mechanical pressure of the contained air upon the heart immediately excites the strong contraction of its right and left sides. A similar stimulus to the heart, and a similar pressure of a full volume of cool air, can be readily and beneficially applied to the congested vessels of the lungs in incipient phthisis.

To this end, in the commencement of the disease (should there be pain in the chest), a moderate bleeding would be found necessary; knowing that the congestion commencing in the minute vessels extends to the large—that the remedy which assists one will relieve the other. Immediately after bleeding, the patient should mechanically assist in restoring the lost tone of those vessels, which can be effected by *gradually* increasing the volume of his inspirations, and, in proportion as the air-tubes are distended with air, the quantity of blood in those congested vessels, by the pressure produced in the act of expiration, will be diminished. Although the relief from bleeding and removal from congestion will be immediate, it will be still necessary to con-

tinue the inhalation of air from time to time; the pressure thus produced will serve as a bandage to those distended vessels; they will thereby regain their natural tone and power of oxygenating the blood; the expectoration will be gradually diminished. Tubercles, if in existence, will be thereby prevented from inflaming and suppurating; if not in existence, from being produced. On the contrary, inhalation of warm vapour of any kind, under such circumstances, would increase the determination of blood to the lungs, add to their congestion, and produce those fatal consequences alluded to in page 93.

On the first appearance of phthisis the patient should at once be removed to air of rather a higher temperature than what he had been previously used to; of such a heat that whilst it could not increase the determination of blood to his lungs, it would not, *per se*, excite a sensation of cold*. No tube or vessel is required to perform inhalation: but it is of considerable importance that the air inhaled should be pure, as, in every case of diseased lungs, varying with its nature and extent, their capacity for generating heat is diminished. In the latter stages of phthisis, and fatal cases of influenza and pneumonia, the exhaled breath is cold.

The constituents of the air are ascertained to be separately unfit for respiration. Even the inhalation

* It is as necessary in phthisis to protect the skin from the effects of cold as the lungs from those of heat.

of pure oxygen (vital air) has been known to produce inflammation of the lungs. Any attempt to substitute a factitious for pure atmospheric air, as an improved stimulus to the lungs, either in health or disease, will be found as vain as to expect, by human efforts, to invert the order of gravity.

Previous to the abatement of primary symptoms the antiphlogistic regimen would appear indispensable; but, as the patient recovers, the strength should be improved. This has ever been the point of difficulty. Hitherto low as well as nutritious regimen have proved equally inefficacious. Here the patient is placed between Scylla and Charybdis: two things must be effected; blood must be made, and fever diminished: but neither can be accomplished unless inflammation and congestion are removed. Their permanent removal hitherto has, perhaps, been never accomplished by ordinary means.

TREATMENT OF PNEUMONIA.

After a severe journey in rain, a young florid man, on retiring to rest, finds his bed damp, and he remains cold all night. In a day or two, he feels a sensation as if his chest were too narrow for its contents; there is a short repeated cough; breathing becomes difficult, quick, and laborious. "Such,"

says Dr. Murray, " are the circumstances commonly preceding pneumonia."

Laennec has assigned it three periods, namely, 1st, obstruction; 2d, hepatization ; and, 3d, purulent infiltration. The proper indication is to prevent the occurrence of the two latter, and remove the first by producing resolution, which, perhaps, could be accomplished in almost every instance by timely application of proper remedies, particularly when the disease occurs in strong constitutions, and is unconnected with phthisis or abdominal irritation. We must consider this disease as merely one of strong determination of blood to the lungs, and consequent congestion. The nature of the disease at once indicates its cure, namely, removal of the congestion by abstraction of blood.

In every case of pneumonia, bleeding is resorted to : but the neglect of taking a sufficient quantity of blood has, in thousands of instances, laid the foundation for adhesions in the cellular membrane of the lungs, and their consequent loss of power of expansion: hence permanent difficulty of breathing *. Whilst the debility arising from the disease, thus protracted, in certain constitutions frequently terminates in phthisis and death.

Dr. Murray has remarked, " that he saw a great number die from want of sufficient depletion in pneu-

* Similar to the affection called thick wind in the horse, and commonly arising from similar causes.

monia, but seldom from too much." Laennec, "that a copious bleeding in the beginning of the disease reduces the inflammatory orgasm much more speedily than repeated smaller venesections." And Dr. Marshall Hall considers, "that there are seldom symptoms of reaction (excessive) after one flow of blood, however great or profuse." The truth of Dr. Gregory's aphorism, "that the danger of a large bleeding is less than the danger of the disease," is generally admitted, at least in *theory*.

In order to restore the lungs in pneumonia to their former state of health, the oppressed state of the pulse should not deter us from bleeding promptly and copiously; but, most particularly, to take away the blood quickly,—to bleed as it were against time.

In treatment of pneumonia* it is, in too many instances, the practice to take away small quantities of blood from time to time: but even the abstraction of a large quantity at once, slowly flowing, will not be safe; for blood flowing from a single vein, particularly if the orifice is small, will be replaced nearly as quickly as it is extracted, and thus congestion will still exist. We must here consider the object to be effected is not only to take blood from the system, but from a part. To that end I would recommend opening the vein of one or both arms, and

* However useful the production of syncope may be in carditis, it will produce mischief in pneumonia previous to a considerable abstraction of blood.

the orifice should be quite as large as the calibre of the vein: the patient should gradually increase the volume of his inspirations, and produce a similar pressure on those congested vessels to what we have already alluded to in treatment of phthisis; and after a little time has elapsed, on appearance of any symptoms of syncope, the patient should then take the recumbent position. However, under these circumstances, it will perhaps be found rarely necessary, as the same pressure which assists in reducing the congestion, and increasing the flow of blood from the orifice, will, at the same time, necessarily increase the action of the left side of the heart, and thereby prevent fainting by constantly supplying the brain with blood.

The temperature of the apartments of pneumonic patients ought to be lower than those of persons suffering from phthisis. The inhalation of cold air should be daily performed, until the congestion should be permanently removed, and the vessels restored to their proper tone.

In hæmoptysis plethorica, in order to prevent a termination in phthisis, a similar removal of congestion is indicated: but, in such cases, there would be considerable danger in making deep inspirations and strong expirations, as the pressure thereby produced might increase the hæmorrhage from the ruptured vessel or vessels of the lungs.

To explain the utility and practicability of this novel method of reducing congestion of the lungs,

we may remark, that, in treatment of pneumonia, other auxiliary remedies, in addition to bleeding, have been resorted to, to produce what has been termed a derivation—a determination of blood from the lungs to other parts, through the agency of the nervous system, by exciting pain with blisters, &c. But one of the oldest of these sort of remedies is vomiting. Hippocrates* recommends "emetics to the healthy as a preservative." Celsus† says, "they are useful to the plethoric, and those who have their digestion impaired." Dr. Cullen remarks, "he knows no way of expediting the circulation in the liver so powerful as that of vomiting."

The utility of vomiting in pneumonia has been strongly advocated by Laennec and the French physicians. Dr. Fothergill‡ says, "the action of emetics is certainly great on the lungs, an unusual quantity of blood is thus suddenly passed through them."

Speaking on pneumonia, Dr. Good says, "when the disease has made considerable advance, emetics must be used boldly, so as to produce full vomiting, and the action must be maintained an hour or two§."

Dr. Fothergill says, "in the administering of emetics to plethoric persons, their use should be *preceded by bleeding*, to prevent rupture of vessels of the head, and produce apoplexy; or, in the lungs,

* Hipp. de Diœta. † De Medicinâ.

‡ De Emeticorum Usu.

§ Good's Practice of Medicine, vol. ii. p. 475.

and thus produce spitting of blood, followed by slow and fatal consumptions."

Dr. Simmons* says, " vomits lessen the determination of blood to the lungs, and *if any* remedy is capable of dispersing tubercles, I believe it to be vomits."

Without entering into the merits of the emetic, as to its quantity or quality, let us look to its effects, and examine how they are produced. Perhaps we can best do so by comparing the process of expiration with that of vomiting †.

According to modern physiology, the lungs in respiration, like the stomach in vomiting, are passive.

The most violent effort of expiration is produced by shutting the glottis, and continuing the dilation or ascent of the diaphragm.

The most violent effort of vomiting is followed by shutting the glottis, and continuing the dilation or ascent of the diaphragm.

Vomiting is an act of the respiratory muscles.

The action, in one case, is partly under the influence of the will, in the other involuntary; but both produce similar effects, namely, the pressure of the air thus confined upon the vessels forces the blood out, and thereby congestion is reduced.

* Practical Observations on Treatment of Consumptions.

† Of forty-seven cases of pneumonia treated by Dr. Hillis of Rouen, by repeated emetics, only five were lost, being a proportion under one in nine. Clinique Med. de l'Hôtel Dieu de Rouen, 1826.

A person, immediately after an attack of sea-sickness, will remark the *peculiar freedom* of breathing which instantly follows: in such cases the vessels of the lungs possess their perfect natural tone.

Recovery from syncope is often effected by vomiting: the blood is thus sent to the brain.

Dr. Good says, "full vomiting augments the general action, and gives great additional energy to the absorbent system to remove inflammation: it thus frequently disperses collections of pus seated in various parts of the body."

In pneumonic congestion, the vessels lose their natural tone; the pulse is oppressed, but becomes more full and powerful on *lessening the distension* by bleeding; evidently showing the disease can only be removed by remedies which have a similar tendency. Next to direct abstraction of blood, this mechanical pressure we here speak of is certainly the most powerful: it possesses the peculiarity that, by its use, the congestion can be relieved *much quicker,* and with a far less loss of blood than by the ordinary method of bleeding—a circumstance, in itself, of vital importance, as the debility, in many cases of congestion, precludes the abstraction of blood in any quantity.

Our general conclusions on phthisis are:—

That it depends upon the softening of tubercles.

That debility of the lungs always precedes their production.

That the debility necessary to their production is excited and increased by every species of pulmonic disease, varying with its extent and duration, from common catarrh to acute pneumonia.

That the power of resisting the exciting cause of tubercles depends upon the strength of the constitution and the previous habits of the individual.

That tubercles are imperfectly organized.

That so long as they are protected from inflammation and suppuration, they will not, *per se*, prove fatal in one instance perhaps out of five hundred.

That the same means which prevent the inflammation of tubercles will tend to prevent their increase.

That the suppuration of tubercles is so far connected with the existence of expectoration, that the former *never* occurs without the latter.

That the congestion *always existing* in the lungs during the softening of tubercles, should, in every case, be the first object to remove.

That the necessity for its removal and the means are the same in either case—whether we consider the tubercles vascular or inorganic—whether as vascular bodies they suppurate, or as inorganic they are softened.

That deep inspirations and strong expirations of cool air can, like vomiting, reduce this congestion, without exciting a similar exhausting languor and lethargy.

That, provided hæmoptysis does not exist, this inhalation of cool air can *never* be injurious in any pulmonic disease.

That the same process of inhalation can be serviceable to persons in comparative health.

That such inhalation, like vomiting, stimulates all the secretions concerned in chylification, and contributes to remove dyspeptic symptoms, by reducing any existing congestion in the liver, spleen, or other abdominal viscera.

GENERAL REMARKS.

In phthisis, the extreme sensibility of the skin to the impression of cold would seem to indicate the immediate removal to an equable temperature. However, sudden transitions from a cold to a warm temperature, or the reverse, will be found to produce similar effects, namely, an increase of congestion and expectoration.

The benefit to be derived to the phthisical, from a mild winter climate, can be very imperfectly supplied by artificial means. Whenever attempted, equal regard should be had to preserve the purity as to increase the warmth of the air. I have frequently witnessed, in London, the application of an artificial temperature of 65° in winter, produced by means of a common stove ; but, it was evident, from the small size and crowded state of the apartments, the total absence of any means of proper ventilation, that whatever benefit *might* be thus derived from the warmth of the air would be more than counterbalanced by its noxious qualities.

In advanced cases of phthisis the lungs lose much of their sensibility. The application of moderate warmth does not then stimulate them to such increase of secretion as in the early stages of the disease *.

* The May Number of the Dublin Journal of Medical and Chemical Science contains a report of a paper read by Dr. Houston before the Members of the Zoological Society of Dublin.

Of late, almost all the inquiries about this disease have been confined to examinations of persons who have died of phthisis, and the observations of Laennec prove what could be done even under such *great disadvantages*. The number of subjects thus examined has been the boast of many writers on the subject, particularly since the time of Bayle, whose inquiries extended to the inspection of nine hundred bodies. The examinations of some modern

It appears, from his examinations after death, that all the monkeys of their collection which have died, died of phthisis, and that even where debility was induced, apparently from some other source or accident, their lungs always presented the appearance of incipient consumption; tubercles being commonly found in their lungs, mesenteric glands, and even, in some instances, the liver was not free from them.

When the London Zoological Society was first established, a great number of monkeys died just in a similar manner, and from similar causes, namely, a want of proper ventilation of their houses. By proper attention to this circumstance, a complete stop has been put to the occurrence of consumption amongst those creatures. To give those animals all the benefit of an artificial climate, their houses, internally, should be constructed of a conical shape; the supply of pure air should be conducted from openings at the bottom of their houses by tubes, of such height and distance from the animals as to obviate the mischief arising from cold currents. Whilst, by placing a fire, externally, over the immediate apex of this conic-shaped ceiling, the light noxious vapours would be continually carried off; the apartments, meantime, as at present, heated with tubes of warm water, and regulated by a thermometer: they could thus breathe warm without mixture of impure air.

practitioners have, it is said, even quadrupled that number. How far such *facts* may speak for their industry and application, they go a little too far to prove the success of their practice; but, after all, what is this examination which, of late, has been almost solely relied upon? The shades of difference, in the appearance of all who die of phthisis, are confined to a few well-known distinctions; including none, which to a person at all familiar with those examinations, that are not usually and correctly foretold by those acquainted with the history of each particular case. It is little better than an examination of effects from which at most we can guess, but never trace, the cause. "Nothing," says Celsus, "is more foolish than to suppose a man has been so in his lifetime as he is found when dying or already dead."

To study the diseases of the lungs, we must not depend upon examination of them only when they are destroyed, when we cannot distinguish a pulmonary from a bronchial tube. It is, in fact, commencing where we should terminate investigation. It is something similar to the plan of the Lagadoan architect, who invented a mode of building, commencing from the roof, and building down to the foundation.

It requires no effort of credulity to admit that the history of the inquiry should commence with the nature and use of the organ in a state of health.

The study of what would induce disease will point out the means to prevent it. We should study what is the first effect of disease, its nature, cause, and consequence? what the means of adding to or arresting it? Auscultation, although it indicates the character, or, it might be said, the topography of the disease, is far from being understood by every physician. Many even entirely dispense with its aid, and perhaps wisely consider it better to have no such criterion to be guided by than to trust to one which, at least to them, is of doubtful character. Without questioning its ingenuity and importance as an auxiliary to observation, it cannot be denied that, as yet, it has effected but little towards the cure of phthisis: with certain exceptions, it is little better than a glass by which we may count the moments of the patient's life, through which, although we cannot remove, we seem privileged to foretel the fatal issue of the disease. Much valuable time and talent have been devoted to reduce auscultation to a system which, perhaps, might be more beneficially employed in discovering the true origin of the disease, or successful remedies for its prevention or cure.

The notorious inability of common or pulmonary catarrh to produce tubercles, in many instances, by no means negatives its power to produce them in all. Either previous or subsequent to such inflammations of the mucous membrane of the lungs, we have no means of proving whether tubercles may or may not

be thinly scattered through the lungs—by auscultation we can detect their existence only when numerous—so that whilst we cannot demonstrate that their first production is ever effected by inflammation, we have, at the same time, still less positive evidence to prove the contrary.

Our opinion of the disease, whilst in its early progress, must be conjectural: we never can put it to the proof: but we can try experiments upon living animals. On such as are obnoxious to phthisis—on the monkey tribe in particular—those creatures so similar to us in their pulmonic diseases; in their anatomy, whose very resemblance to man constitutes their deformity. In them we can create the disease: we can examine it in every stage of its progress. By this method alone can we confute those ingenious, imaginary histories of phthisis, which belong rather to the science of painting than of physic. In a word, by these means alone can we fairly estimate the true value of any method of prevention or cure.

Note.—The only justification the author can offer for his remarks upon Laennec in page 36, is the fact of his having erroneously supposed the terms "foreign and unorganized" bodies as synonymous: the error was detected too late to notice it in its proper place.

FINIS.

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